THE DEAN REPLIES[1]

Every year sees some one "busting into public print" (I believe that is the proper expression) with a tirade against the College of Agriculture and its graduates. It seems to make acceptable copy when other subjects have been worn out, and it has the advantage of being a topic which apparently needs no study, it being the usual thing to merely echo previous groundless pronouncements. We have really grown quite accustomed to being held up as a "horrid example" and certainly hope that it does somebody or something, some constructive good. This time it is Mr. Pedro de la Llana who in the *Manila Daily Bulletin*, dated March 28, 1927, says:

> The same thing happens with the graduates of the College of Agriculture. Here is a center of learning where the students are taught the principles of scientific farming. They spend three or four years of collegiate work, burning midnight oil in their endeavor to absorb all the knowledge needed for the increase of production. Thousands of pesos are spent by the Philippine government for the support of this school. Yet after the students graduate from the same, because of lack of capital, they are left helpless and have to engage in other kinds of work, generally of the white-collar variety.

We took the trouble last year to prepare a detailed report on the subsequent performance of all the graduates of this College from the beginning, bringing out facts as to the great material success of many of them, the good work they were all doing and the striking fact that a much larger percentage of them were actually engaged in various phases of the agricultural development of their home country than occurs in case of any American institution of this type known to us. At that time we pointed out that we were doing it for the special benefit of writers who were prone to "go off half-cocked" on this subject, the graduates themselves not suffering from need of an apologist, being fully competent and well prepared to defend their own reputations. Naturally, Mr. De la Llana could not have seen this data (certainly never even inquired for it) or he would not have perpetrated another baseless slander of this kind. Understand us—we find only one serious flaw in our friend, Mr. Pedro de la Llana, and that is that he failed to take a course in the College of Agriculture! It might have been the saving of him.

Mr. De la Llana reminds me of that classical type of spinster who knows volumes more of how to take care of children than any mother can know! He writes with disdain of "white collar jobs" though he is in such a job himself, drawing pap from the public teat! If one has to have some money,

[1] General contribution from the College of Agriculture No. 185.

I have never seen any evidence that a "white-collar job" was a less honorable method of getting it than any other—as a temporary shift, anyway. The "white-collar jobs" need and seek men—the best available—to fill them, or there wouldn't be any such jobs. It is granted that most young Filipinos would do well to use the "white-collar jobs" only as stepping stones to constructive and productive parts in Philippines industries, and numbers of our young men have already very successfully so used them. Let Mr. De la Llana list the older "young men" with whom, unfortunately, the "white-collar job" has become a habit and like Abou Ben Adhem, lo, his name will lead all the rest! At least, to be consistent, he should introduce a bill in the Legislature, denying government jobs to any graduates of this College—and that we would applaud.

Mr. De la Llana's method of teaching certainly represents a hopeless type of pedagogy. Exciting of great enthusiasms and ambitions, and leading on to great achievement is *not* accomplished by persistent inculcation of the inferiority complex, no more in a nation or an institution than in an individual. Tell Johnny often enough that he is hopelessly "no account" and he will begin to believe it! Curiously enough, the most persistent slanderers of the rising generation in this country are *Filipinos*—judging from public utterances and literary effusions. I, an American, believe that, giving them *equal preparation* and opportunities, we shall get, *ultimately*, as good a proportion of real successes, as can be obtained from the rising generation in any country. I believe in the *coming Filipino!* I have already bet heavily—the stakes the heaviest any man can lay—on a good many of them, and even now I am winning past my most sanguine earlier expectations. Young Filipinos are *not supermen*, to become public figures, great leaders, financial giants, eminent scientists, industrial kings, within a few years after graduation—especially from a scratch start—but Time can have no richer promise in human affairs than that coming from our agricultural graduates. I believe in them thoroughly, even if Mr. De la Llana does not!

Come on, boys! You have only one *serious* shortcoming, and that is, there are not enough of you!

Charles Fuller Baker,
Dean, College of Agriculture.

EDUCATION AND AGRICULTURAL PROMOTION IN JAPAN: III. RESEARCH WORK[1]

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GOVERNMENTAL RESEARCH INSTITUTIONS

To say that no government existing at present has a keener realization of the value of systematic research in the promotion of the well-being of the people and has translated this realization into action more effectively than Japan is, I believe, to keep well within the bounds of truth. The innate sense of order of the Japanese, and the pressure of population making demand for the most effective utilization of the country's available resources partially account for this organized interest. A paternal government that is almost patriarchal in its concern for the welfare of the people gives every encouragement to the systematic pursuit of knowledge.

The number of research institutions supported by government are varied and numerous. A simple perusal of the list may give the impression that efforts are scattered to cover the field, but a visit to the different institutions will convince the most skeptical that the substance as well as the name is there. The writer was able to visit a number of government experiment stations and he was greatly impressed with the comprehensiveness of their organization, the quality of their personnel, the excellent equipment of their laboratories, the liberal support they receive, and the high quality of the research output.

A list of the more important government research institutions follows[2]:

Ministry of Agriculture and Forestry:

1. Imperial Agricultural Experiment Station...Nishigahara, Tokyo.
   Staff: 18 experts and 30 assistants.
2. Imperial Horticultural Experiment Station...Okitsu, Shidzuoka.
   Staff: 3 experts and 8 assistants.
3. Tea Experiment Station.....Kanaya, Shidzuoka.
   Staff: 3 experts and 5 assistants.
4. Forestry Experiment Station.....Shimo-Meguro, Tokyo.
   Staff: 15 experts and 30 assistants.
5. Imperial Sericultural Experiment Station....Nakano, Tokyo.
   Staff: 18 experts and 16 assistants.

[1] General contribution from the College of Agriculture No. 186.

[2] Shinjo, Shinzo, et al. 1926. Scientific Japan, past and present. ii+359 p. 47 pl. Tokyo: Maruzen Co., Ltd.

6. Experiment Station for Ornithology and Mammology.....Renkoji, Tokyo.
   Staff: 1 expert and 1 assistant.
7. Imperial Zoötechnical Experiment Station...Miyako Mura, Chiba.
   Staff: 10 experts and 16 assistants.
8. Veterinary Laboratory.....Nishigahara, Tokyo.
   Staff: 6 experts and 32 assistants.
9. Imperial Fisheries Institute.....Yetchu Jima, Tokyo.
   Staff: 15 professors, 8 assistant professors, 25 technical experts and 108 assistants.

Ministry of Commerce and Industry:

1. Imperial Geological Survey.....Kyobashi-ku, Tokyo.
   Staff: 15 experts.
2. Bureau of Weights and Measures.....Tokyo.
   Staff: 12 experts and 67 assistants.
3. Nitrogen Research Laboratory.....Nakameguro, Tokyo.
   Staff: 10 experts and 10 assistants.
4. Imperial Fuel Research Institute.....Kawaguachi Machi, Saitama Prefecture.
   Staff: 8 experts and 12 assistants.
5. Imperial Ceramic Research Laboratory.....Hon-machi, Kyoto.
   Staff: 2 experts and 7 assistants.
6. Mine Explosions Experiment Station.....Mitate Yama, Fukuoka.
   Staff: 2 experts and 6 assistants.
7. Research Laboratory, Imperial Steel Works..Yahata, Fukuoka.
   Staff: Officials of steel works.
8. Imperial Experiment Station for the Silk Industry.....Hon-machi, Yokohama.
   Staff: 6 experts and 8 assistants.
9. Tokyo Imperial Industrial Laboratory.....Hatagaya, Tokyo.
   Staff: 15 experts and 24 assistants.
10. Osaka Imperial Industrial Laboratory.....Ohito-cho, Osaka.

Ministry of Home Affairs:

1. Imperial Institute for Nutrition.....Kago-machi, Tokyo.
   Staff: 6 experts and 11 assistants.
2. Tokyo Imperial Hygienic Laboratory.....Idzumi-cho, Tokyo.
   Staff: 16 experts and 25 assistants.
3. Osaka Imperial Hygienic Laboratory.....Kyobashi 3-chome, Osaka.
   Staff: 3 experts and 8 assistants.

Ministry of Finance:

1. Government Institute for Brewing.....Takinogawa, Tokyo Prefecture.
   Staff: 6 experts and 8 assistants.
2. Central Research Laboratory of Monopoly Bureau.....Hiratsuka Mura, Tokyo Prefecture.
   Staff: 8 experts and 17 assistants.

Ministry of Communications:

1. Electro-technical Laboratory.....Osaki-machi, Tokyo.
   Staff: 29 experts and 136 assistants.

Ministry of Railways:

1. Railway Research Office.....Tokyo.
   Staff: 6 experts and 50 assistants.

Ministry of War:

1. Military Land Survey Department.....Nagata-cho, Tokyo.
   Staff: 30 officers and 50 engineers.
2. Military Scientific Laboratory.....Tokyo.
   Staff: 28 officers, 5 engineers, and 30 assistants.

Ministry of the Navy:

1. Hydrographic Department.....Tsukiji, Tokyo.
   Staff: 27 naval officers, 12 civil officials, and 58 assistants.
2. Naval Experimental and Research Establishment.....Tsukiji, Tokyo.
   Staff: 95 research members.

It may be seen from the above list that practically all branches of government carry on research fundamental to their administrative and regulatory duties. While this is so, however, the experimental field is rarely, if ever, subordinated to the administrative functions of the ministry, thus freeing its personnel from possible disturbance in their work should there be an urgent call for more help in administration, as sometimes occurs in emergencies. The directors of the research stations recognize as their immediate head the minister of the department, and their position in government is co-ordinate with that of administrative heads of bureaus. Their relationship with the latter is purely co-operative, as members of the same "family". In so far as the writer was able to ascertain, this relationship was most effective and cordial.

As a rule, an institute or experiment station is a complete and independent unit by itself and carries all the necessary divisions to enable it to meet the problems on hand properly. To cite two examples: the Imperial Sericultural Experiment Station has divisions of biology, chemistry, pathology, filature, mulberry trees, and general affairs; the Imperial Agricultural Experiment Station has divisions of plant breeding and cultivation, agricultural chemistry, phytopathology, applied entomology, soils, and agricultural engineering. This arrangement appears to be extremely satisfactory. While the name of one division may be similar to that of other divisions in other stations, the work is fairly distinct and bears directly on the particular problem of that experiment station.

Some of the larger prefectures, as Hokkaido, and Formosa and Korea have their own government research institutes in agriculture and industries, independent of those of Japan proper.

In addition to the institutes named above there are four astronomical and twelve meteorological and geophysical observatories, all actively engaged in research.

PRIVATE RESEARCH INSTITUTIONS

Privately endowed research institutions in Japan are comparatively rare and do not occupy the same prominent position that they do in Eng-

land and the United States. Most of them have been established within the last decade, and their activities are restricted to limited fields. However, if we may view the recent establishment of these privately endowed institutes as an indication of a tendency, we may expect them to increase in number and to gain prominence with the years. The most prominent of these are:

1. Institute of Physical and Chemical Research...Kamifujimae-cho, Tokyo.
   Staff: 343 researchers.
2. Shiomi Physical and Chemical Research Institute.....Hamadori 3-chome, Osaka.
   Staff: 3 experts.
3. Saito Laboratory of Electrical Communication..Sendai.
   Staff: 8 experts and 22 assistants.
4. Tokugawa Institute of Biological Research.....Koyama, Hiratsuka Mura.
   Staff: 6 researchers.
5. Nawa's Entomological Laboratory.....Omiya-cho, Gifu.
   Staff: 1 expert and 3 assistants.
6. Ohara Institute for Biological Research.....Kurashiki-machi, Okayama.
   Staff: 7 researchers.
7. Kitasato Institute for Infectious Diseases.....Shirokane-sankocho, Tokyo.
   Staff: 16 researchers and 53 assistants.
8. Takeo Institute for Tuberculosis.....Hamadori Sanchome, Osaka.
   Staff: 15 researchers.
9. Institute for the Investigation of the Science of Labor.....Kurashiki-machi, Okayama.
   Staff: 4 researchers.

To the above list could be added the research departments of industrial concerns, such as those of the Tokyo Electric Company, The Shibaura Engineering Works, Japan Steel Works, Asahi Glass Co., Mitsubishi Paper Mills, and a host of others. Many of these are most liberally subsidized and carry on very valuable work.

Special mention should be made of the Institute of Physical and Chemical Research[3], because of its relatively large endowment and personnel, its program of work, and its unique method of financing its future. It has an endowment of Yen 6,228,700, 1,000,000 of which was an Imperial Gift, 2,000,000 a government subsidy, and the rest, or 3,228,700 was contributed from official sources and from individuals. The institute concerns itself primarily with investigations in the pure sciences of physics and chemistry with a view to developing new applications.

[3] Guide to the Institute of Physical and Chemical Research, Tokyo, 1926. Published by the Institute.

Once a problem is completed in the laboratory it is tested for its industrial applicability. If this is satisfactory, the rights or patents are let out to a manufacturing concern for exploitation under suitable financial arrangements, and any returns are partly used for financing the pure science work of the Institute and partly given as a reward to the inventor or discoverer. The Institute was established in March, 1917, and on May, 1926 it possessed 103 items of domestic patent rights and 21 items of foreign patent rights. Its income in 1926 from factories using its inventions and from royalties for the use of its patent rights amounted to Yen 496,000.

THE IMPERIAL UNIVERSITIES

A description of research institutions in Japan would be incomplete without special mention of the Imperial Universities. These are really the mother institutions from which all others derive not only their personnel but also inspiration. They have set such high standards that their work commands confidence and respect throughout Japan. It is rare to find a prominent scientist who is not or was not at one time or another connected with some one of the Imperial Universities. There are five of these; they are located in Tokyo, Kyoto, Sapporo, Sendai, and Fukuoka and are so situated that each serves a particular section of the Empire. Two other Imperial Universities, one in Korea and the other in Formosa, are in their formative stage.

In the organization of the Imperial Universities it is specifically provided that they prosecute original research "in such sciences as are required for the purposes of the State." This function is only secondary to teaching. In the creation of chairs in the natural sciences, therefore, the objective is not lost sight of and a financial provision is attached to it. This amounts to about Yen 3,000 for professors and half this amount for assistant professors. A more or less complete freedom is allowed the incumbent in the use of this allotment. Thanks to this wise provision, research is properly stimulated. This arrangement gives little room for evasion of responsibility, or for alibis in case of inactivity, and forthwith demonstrates the fitness of the incumbent for the work on hand. How much wiser this system is than the one generally followed of providing salaries for workers and no means or materials for them to work with, thus making their employment in the first place utterly superfluous, needs only to be considered to be realized. Most university departments function as independent institutes for all practical purposes and are so equipped as to be able to attack problems with which they are concerned from all possible angles without the need of enlisting the co-operation of other departments.

The thirst for higher education in Japan has created an army of well-qualified aspirants to university positions. Competition is, therefore, very keen and only the best reach the goal. The personnel of the Imperial Universities, in so far as one may be permitted to pass judgment, is unusually

competent, especially so in the case of the younger members who have had to meet an even more strenuous competition than their elders did.

LEARNED SOCIETIES

There are two very important learned societies in Japan, honorary in nature, as distinct from a host of societies composed of specialists in practically every recognized branch of human learning. These numerous societies are similar in nature to professional societies found elsewhere and no further mention will be made of them. The honorary societies referred to are the Imperial Academy and the National Research Council.

The Imperial Academy [4], established in 1879, corresponds to the Royal Society of Great Britain and the Académie Française. Its membership is limited to 100 and they are appointed by the Emperor from among the most reputed intellectuals of the Empire. It is divided into two sections: literature and social affairs and science. The membership is evenly divided between the two sections. The Academy receives financial aid from the government, but the greater part of its income is derived from private donations. Its objective is to stimulate culture through honorary recognition. It publishes its proceedings in Japanese, German, English, and French.

The National Research Council of Japan, like many other research councils, is a product of the World War. It was organized in 1919 by the Minister of Education [5]. It acts as an advisory body to the government on scientific matters and their application. Its existence has been continued as a permanent organization even after the War and is now affiliated with the International Scientific Research Council. The membership is limited to 100 and members are appointed by the Ministry of Education upon recommendation of the Council. The Council is divided into research departments and the members are attached to one or more departments, depending on their specialties. The departments recognized are astronomy, geodesy, chemistry, physics, geology, and geography, biology and agriculture, medicine, engineering, and mathematics. Each department publishes one or more journals.

It is needless to say that membership in either of these societies is a signal honor conferred on the holder. Members of the Academy over 60 years old receive an annuity.

[4] Takenobu, Y. The Japan Year Book, 1926. Year Book Office, Tokyo.
[5] *Vide* Japan Year Book, 1926.

LOWERING COST OF RICE PRODUCTION[1]

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Rice growing in the Philippines is an important problem among the farmers. In various surveys made on the cost of production of this crop, it was found that the cost was greater than the market value. Among the principal items which are responsible for this high cost of production are planting, weeding, harvesting, and threshing—all of which are done by hand.

In the Philippines there are two methods of growing rice; namely, the lowland and the upland. The lowland method, though it is the more tedious and harder on health of workers, is generally practiced throughout the Philippines. In fact, the bulk of the rice commercially grown in the Philippines is raised by this method. Several changes have been introduced to improve the lowland method but these have generally failed to accomplish their purpose. Machinery cannot be used in the preparation of the land or mucking, in transplanting the seedlings, or in harvesting. The reasons for this are obvious. In the first place, the space in which to work a machine is limited by the dikes, which enclose on the average an area of about 1000 square meters. In the second place, weather conditions are rather uncertain so that the use of machinery would not be economical, especially during the rainy season.

The method used in California can be used under Philippine conditions provided there is irrigation so that planting can be done during the dry season. Two objections are raised, however, to this method; one is that most of our short season varieties of rice are, as a rule, low yielders; the other is that the dry season is not long enough to warrant the use of this method. It is believed that these objections can be overcome by practicing seed selection and quick preparation of the land. In seed selection, erect and early maturing varieties of rice should be used so that the machines may function efficiently. The entire work would involve only from four to five months from preparation of the land to the harvesting of the crop.

The upland method of cultivating rice is believed to offer the greatest possibilities for effective lowering of cost of production. Machines can be used in this method because in most regions of the Philippines there are two dry seasons, a short one lasting from 15 to 20 days or a month and a long one lasting from four to five months. If rice is planted so as to mature in either one of these dry seasons it can be harvested safely, because all the operations

[1] Experiment Station contribution No. 443. Received for publication January 24, 1927.

would be carried out when the soil is dry. In upland fields there are no barriers to operation of machines.

This upland method has been given a trial at the College of Agriculture Experiment Station and found to be very economical. The cost of production has been reduced to not more than a peso a cavan ($.50 a sack of 75 liters). This cost does not include the handling of rice after it leaves the field.

The saving, for the most part, is in the operations of preparation of land, seeding, weeding, and harvesting.

Preparation of the land. The land was plowed just after the last crop was harvested or before the ground became hard. A tractor-drawn disc plow was used to a depth of not less than 15.24 centimeters. This was done to bury the seeds of the weeds that were scattered on the surface of the ground. The harrowing was with a disc harrow with a drag behind it in order to smooth the field as much as possible. The field was left in this condition until the weeds germinated after the first rain in May. As soon as the weeds attained the height of about 5 to 8 centimeters, the disc harrow with the spike tooth harrow behind it was run over the fields both lengthwise and crosswise, thus destroying practically all the weeds. The depth of the cut made by the disc harrow on this mellow soil ranged from 7.64 to 10.16 centimeters, thus giving a good rice seed bed in which the young rice can grow lustily.

Seeding. The seeder that was used in this work was a La Crosse tractor drawn drill with 18 rows. The rows were set at about 17.8 centimeters apart and the seed used was about 90 liters to the hectare. The depth of planting was about 5.08 centimeters. This depth was required so that the seeds would be deposited in the moist layer of the soil.

Weeding. As the College has no weeder, regular Calamba and Batangueño cultivators were used. These implements were altered in such a way that only three shovels were used. The shovels were made to run in a straight line instead of in its usual triangular arrangement. The reason for this arrangement was to have the soil which was pushed aside by the shovels meet at the base of the seedlings, thus forming a ridge. If the shovels were not arranged in this way the tendency would be to ridge one side of the hill at a time, thus when the hilling was completed by the next shovel some of the bent plants from the first shovel would be covered.

These cultivators were drawn by one bullock which was made to walk in the furrow space thus straddling a row. The number of cultivations depended upon the condition of the field. In general, four cultivations were considered enough. The last hilling was done when the rice was about 15 centimeters tall. After the last cultivation the rice was left untouched until harvest.

When weeding is done by hand using the hand trowel (*dulus*) the average number of laborers to weed a hectare is fifty, while with animal and cultivator one man can cultivate a hectare in one day.

Harvesting. One of the difficult operations in producing upland rice is the harvesting, as the crop must be harvested and threshed within a very limited time. The harvesting must be done at a time when there is sunshine and during the rainy season sunny days are very few and often very short. For this reason, a quick method must be used. A rice binder, such as is employed in California and other rice growing regions in the United States, will serve the purpose. The binder that was used in connection with this work was a Deering rice binder, manufactured by the International Harvester Company. It gave very satisfactory results. When it is pulled by three bullocks and operated by a man using it for the first time, it can cut an average of one hectare in a period of six hours and ten minutes. This average was taken from a six-hectare lot. The machine is followed by two gleaners. The rate can be greatly increased by using a faster power to pull the machine and with a wider cut, or swath. At the rate of six hours and ten minutes to the hectare it was found to be equivalent to fifty persons, and the grain wasted during the operation is less than when harvesting is done by hand.

In threshing, the rice must be dry so that the threshing machine functions well. If the cutting of rice is done on a sunny day and the bundles are piled before the rain falls on them, and threshed when weather permits, good results will be obtained. But once the rain wets the bundles, the threshing will be very difficult. A good method is to follow the binder with immediate threshing thus threshing the grain on the same day it is cut. The threshed rice is spread thinly on the wooden floor of a shed so as to prevent heating, and dried as soon as weather permits.

GROWING PEANUTS FROM CUTTINGS[1]

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WITH TWO TEXT FIGURES AND ONE PLATE

Peanut (*Arachis hypogaea*), in the Philippines, is raised exclusively from seed. As the peanut seed contains a comparatively high percentage of oil, running from 40 to 55 per cent, it is very difficult to preserve its vitality in this tropical country. For this reason, the keeping of the peanut seed becomes an important item in peanut growing, as the extent of the culture of the crop depends upon the supply of good seed for planting.

The peanut seed is large, requiring about 855 seeds of the large-seeded varieties, and about 1530 of the small-seeded ones to make a liter. With the native method of planting it requires about one and one-half to three and one-half cavans (112.5 to 262.5 liters) of peanuts to plant a hectare. This is a considerable amount.

The use of peanut cuttings for planting might help solve the seed problem in connection with peanut cultivation, as the preserving of seed and its high cost would be eliminated. Believing that a study of the production of peanut from cuttings would be of practical value to the farmer, and, perhaps, to the plant breeder, in the maintenance of a superior pure strain, an experiment was carried out with the object of finding out the yielding power of peanut cuttings. The experiment was conducted in the Philippine College of Agriculture. A preliminary study was made during the College year of 1925–26. The experiment reported herein was started in July 22, 1926 and closed on November 18, 1926.

So far as the writer knows, no previous study on the production of peanut from cuttings has been made in the Philippines. The only study on this subject that he found is that reported by Guerrero (1923) of Guam[2]. In this study a test was made between sexual and vegetative methods of propagating peanuts. The report states that "no apparent differences were observed in the manner of growth of vine produced from seed and those from cuttings." The native variety used produced more pods and vines from cuttings, while the Chinese varieties propagated from seed gave higher yields of pods and vines.

[1] Experiment Station contribution No. 444. Received for publication, January 10, 1927. Read before the Los Baños Biological Club, December 16, 1926.

[2] Guerrero, Joaquin. 1923. Report of the assistant in agronomy and horticulture. Report of the Guam Agricultural Experiment Station, 1921: 8–26.

MATERIALS AND METHODS

In this experiment three varieties of peanut were used; namely, Kinorales, Lemery, and Valencia. All of these varieties belong to the bushy type.

Cuttings from peanut plants forty-three days old were prepared as illustrated in figure 1. Only the tops were used, and the cuttings were about 15 centimeters long. The cuttings were prepared and planted in the same afternoon. They were planted in furrows in a vertical position and covered with soil to almost the tip. Side by side with the cuttings, seeds of the varieties used were planted to serve as check.

Fig. 1.—Peanut cuttings prepared for planting.

About a month after planting, the plants were thinned out so that the ones left were 30 centimeters apart in the rows. The plants were cultivated three times, the soil being thrown towards the plants in the last cultivation to form ridges along the rows of the plants. The ground was kept well weeded.

EXPERIMENTS AND RESULTS

Before the plants were thinned out, the percentage of germination of the peanut seed and the percentage of rooting of the peanut cuttings were determined. Table 1 presents the results.

TABLE 1

Showing the percentage of germination of peanut seed and of rooting of peanut seedlings

VARIETY NAME	SEED			CUTTING		
	Planted	Germinated		Planted	Rooted	
	number	*number*	*per cent*	*number*	*number*	*per cent*
Kinorales	67	65	97.01	67	67	100.00
Lemery	61	55	90.16	61	50	81.97
Valencia	70	68	97.14	70	61	87.14
Average			94.77			89.70

The plants from both seed and cuttings grew normally to maturity. The three varieties used matured at practically the same time. They were all harvested on November 18, 1926. The plants were carefully dug up and washed so as to remove any soil adhering to the roots and pods. After two days drying, the number of developed and undeveloped pods and the stipes without pods of the individual plants produced from each of the two kinds of propagating materials were counted. Also, the weight of the pods and of the straw of each plant was found separately.

Table 2 gives the average number of developed and undeveloped pods and the stipes without pods from the plants from seed and cuttings.

Table 3 gives the average yield of straw and table 4 the average yield of pods of the same plants.

TABLE 2

Showing the average production of pods and stipes per plant of peanuts from seed and from cuttings

VARIETY NAME	PROPAGATING MATERIALS	NUMBER OF:		
		Developed pods	Undeveloped pods	Stipes without pods
Kinorales	seed	26.10±1.15	11.90±0.67	20.40±1.51
Kinorales	cutting	23.30±0.89	13.90±0.64	33.10±2.04
Lemery	seed	19.20±1.21	10.70±0.92	15.00±2.11
Lemery	cutting	18.00±0.96	8.60±0.70	27.00±2.32
Valencia	seed	23.40±0.94	13.90±0.99	18.30±0.94
Valencia	cutting	14.40±0.73	10.10±0.74	13.70±0.87

TABLE 3

Showing the average production of straw per plant of plants from seed and from cuttings

VARIETY NAME	PLANTS FROM SEED	PLANTS FROM CUTTINGS	DIFFERENCE
	grams	*grams*	*grams*
Kinorales	46.30±2.80	50.70±1.82	4.40±3.34 (insignificant)
Lemery	71.30±5.71	57.00±3.52	14.30±6.71 (insignificant)
Valencia	80.80±5.61	62.70±2.53	18.10±6.15 (insignificant)

TABLE 4

Showing the average production of pods per plant of plants from seed and from cuttings

VARIETY NAME	PLANTS FROM SEED	PLANTS FROM CUTTINGS	DIFFERENCE
	grams	*grams*	*grams*
Kinorales	39.00 ±2.01	38.70 ±1.30	0.30 ±2.39 (insignificant)
Lemery	29.70 ±1.77	28.90 ±1.58	0.80 ±1.58 (insignificant)
Valencia	40.90 ±1.68	25.30 ±1.39	15.60 ±2.18 (significant)

DISCUSSION OF RESULTS

The cuttings of the three varieties of peanut used produced plants that matured normally. The plants from cuttings, however, recovered rather slowly at the start, but when they had fully recovered, they grew vigorously

Fig. 2.—One and one-half months old peanut plants from cuttings.

and overtook the plants from seed. Both the plants from seed and those from cuttings flowered at practically the same time. At this stage it was hard to distinguish the plants from seed from those from cuttings. No

apparent differences as to the mode of growth and the production of vines were noted in the plants propagated sexually and those propagated asexually.

From the results of this short piece of work, it can be stated that some varieties of peanut can be propagated asexually rather easily. The percentage of rooting was comparatively high, ranging from 81.96 per cent for variety Lemery to 100 per cent for variety Kinorales (see table 1). The average percentage of rooting of the cuttings from the three varieties used was 89.69, while the average germination of the seeds of the same varieties was 94.75 per cent.

It is interesting to note that the peanut cuttings produced their roots only at the cut (see figure 2 and *a* in figures 1 and 2, plate I). As was expected, no roots developed from the nodes nor from any other portion of the plant. It is therefore very essential that the cut should be smooth and clean so as to hasten callousing; this may lead to higher percentage of rooting. It is apparent that the plants from cuttings had less developed root systems than those from seeds.

In table 2 is presented the average number of developed pods, undeveloped pods, and stipes without pods to the plant, of the plants from seed and those from cuttings. It is shown that in all the three varieties used, the plants from seed, except in the case of variety Kinorales, produced more pods both developed and undeveloped than the plants from cuttings. With variety Kinorales, the plants from cuttings produced more undeveloped pods than the plants from seeds. On the other hand, the plants from cuttings, except variety Valencia, produced a greater number of stipes without pods than the plants from seed. The presence of numerous non-bearing stipes is shown in *a*, figure 1, plate I. Many of the stipes of the asexually propagated plants of Kinorales and Lemery were not able to produce pods, owing, perhaps, to their inability to reach the ground. Planting the cuttings in deep furrows and covering them during the last cultivation may enable the non-bearing stipes to produce pods.

The plants from seed, with the exception of Kinorales, actually produced more straw to the plant than the plants from cuttings (see table 3). But according to the usual way of interpretation of experimental results, the differences in yields of straw as shown in table 3 are not significant. In other words, peanut cuttings of the three varieties used are as good as seed for forage and hay purposes. Besides, the relative low cost of cuttings as propagating material may justify their use.

As shown in table 4, the plants from seed in all the varieties used produced more pods as expressed in grams than those from cuttings. The three varieties, however, varied in their production of pods. In the case of variety Valencia, the average yield of pods per plant of the plants from seed was 40.90 ± 1.68 grams, while those from cuttings gave an average of 25.30 ± 1.39 grams, giving a significant difference in favor of the plants from seed. With Kinorales and Lemery, although the plants from seed produced a few more

pods, the differences were insignificant. That is, the plants from seeds and those from cuttings of varieties Kinorales and Lemery had practically the same yielding power. Kinorales plants from seed produced 39.00 ± 2.01 grams of pods per plant, while the plants from cuttings gave an average of 38.70 ± 1.30 grams of pods per plant. Lemery plants from seed gave 29.70 ± 1.77 grams of pods per plant on the average, while those from cuttings gave 28.90 ± 1.58 grams.

This result is very significant. It shows that there are varieties of peanut that could be propagated asexually for commercial plantings in the Philippines, as Guerrero (1923) found to be true in Guam. The result further suggests a possible practical solution of doing away with the difficult problem of preserving peanut seed. Besides, by resorting to asexual propagation of peanut, the item of expense for seed could be lessened. Peanut seed which brings a good price could be sold instead of planted.

SUMMARY OF CONCLUSIONS

The limited data herein reported seem to justify the following conclusions:

1. Peanut can be propagated asexually under Philippine conditions with comparatively high success. The percentage of rooting of cuttings from plants forty-three days old varied from 81.97 per cent for Lemery to 100 per cent for Kinorales.

2. In general, the plants from cuttings produced about as much as the plants from seed. Of the three varieties used, the plants from seed and those from cuttings of Kinorales and Lemery had practically the same yielding power of pods. Valencia plants from seed, however, were decidedly better than those from cuttings.

3. The differences of the straw production of the two kinds of propagating material in the three varieties used were insignificant. However, the plants from cuttings of Valencia and Lemery had the tendency to produce more straw than the plants from seed.

4. While, in general, the plants from seed produced a slightly greater number of pods, both developed and undeveloped, than the plants from cuttings, these produced more stipes without pods. The potential pod producing power of the two kinds of propagating material were practically the same.

The results herein reported undoubtedly open up a new field of research for the amelioration and increase of the peanut industry. A more thorough study of the use of peanut cuttings of different kinds for field planting, and the best season of the year for planting, would certainly give results that would be of practical value.

ILLUSTRATIONS

PLATE I

Figure 1. Matured Valencia peanut plants. (*a*) Peanut plant from cutting. (*b*) Peanut plant from seed.

Figure 2. Matured Kinorales peanut plants. (*a*) Peanut plant from cutting. (*b*) Peanut plant from seed.

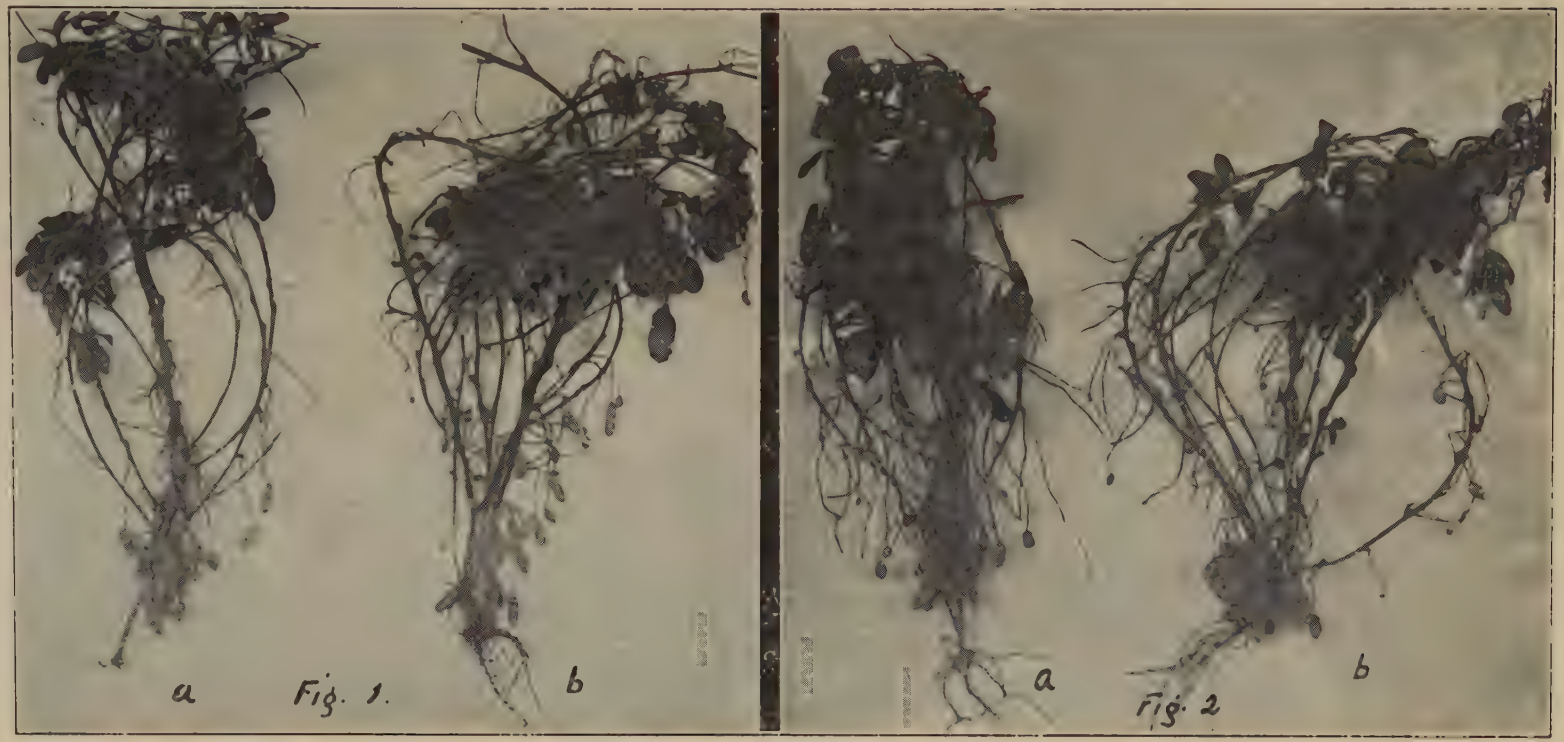

PLATE I

STUDY OF THE TOBACCO GROWERS' ASSOCIATION INC. OF TUGUEGARAO, CAGAYAN[1]

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PURPOSE OF THE STUDY

This study of the Tobacco Growers' Association Inc. of Tuguegarao, Cagayan, was conducted during December, 1925 and April and May, 1926. It involved an analysis of the organization, its operations, membership relations, comparison of selling prices of tobacco obtained by members of the association with those received by non-members, its selling program, and other points of interest.

The main purpose of the study was to give to students in the course on Rural Co-operation and Credit given in our department the opportunity to get first hand information about the practical application of the fundamental principles of co-operation as applied to farmers' business. It was believed also that the data obtained might be helpful to other associations that may be organized, as this association is the first of its kind in the Islands, except the one established in Ilagan, Isabela, by the same man who organized the Tuguegarao association.

In conducting this study the writer interviewed the agents of the government promotion work, such as the Agent of the Bureau of Commerce and Industry who is the organizer and adviser of the association, the Farm Adviser of the province and some local government officials; and several members of the association in the different barrios of the municipality of Tuguegarao, local agents, called *almaceneros*, of the companies buying tobacco in the Cagayan Valley and some politicians interested in tobacco business. In addition to these interviews, the writer used as references the Report of the Survey Committee that investigated the tobacco industry in the Cagayan Valley in April and May, 1926 and Circular No. 397 of the United States Department of Agriculture entitled *Farmers' Co-operative Business Study* and some other works on tobacco.

FEATURES OF THE ASSOCIATION

Through their collective sale of their tobacco of the 1925 crop the members of the association showed to the tobacco growers of Cagayan that their crop could be sold through co-operation for prices adjusted to the quality of product. Before the organization of this association, the local

[1] Experiment Station contribution No. 445. Received for publication March 11, 1927.

buying companies or individual buyers in the locality fixed the prices for the tobacco of the farmers regardless of quality. Tobacco leaf of the highest quality was bought at the same price as the lowest grade leaf—a method of buying locally known as the *uno-con-otro* method.

In so far as the product of the members is concerned the association seems to have succeeded in stopping this old practice of the local buyers. They now have to pay for the tobacco bought from the members according to the class of the leaf as classified by the farmer in accordance with instructions given by the association. The association requires its members to classify their tobacco before sale by a simple process. It consists in separating the *clases* from the *menores*. (*Clases* are the leaves suitable for cigar making and *menores* are leaves used for fillers and minor purposes.) The buyers send representatives to approve or disapprove the farmer's classification before any offer for the tobacco is made. When a disagreement arises because of this classification between the representative of the buyer and the farmer, the matter is arranged by a committee of arbitration composed of a representative of the buying company and a representative of the association. If this committee decides that the classification is not satisfactory, adjustment is made to conform with this decision.

The association accumulates funds from commissions it receives from buying companies. These commissions depend upon the quantity of the tobacco sold. They range from fifty centavos to one peso per 100 *palillos*.

In the beginning this commission constituted the only income of the association. The fund enabled the association to help some of its members finance their farm operations and other needs by giving them character loans or crop loans, and to pay for the services of some of its officers.

The other important feature of the activities of the association was the establishment of a line of stores for merchandise where the members and the general public could buy their staple necessities. At the time this study was begun in December, 1925, the first store of the association was operating in the barrio of Annafunan.

THE ORGANIZATION OF THE ASSOCIATION

The Tobacco Growers' Association Inc. of Tuguegarao, Cagayan, was incorporated under the Bureau of Commerce and Industry in 1924. Its central office is located in the barrio of Annafunan, the largest of the thirteen barrios covered by the association in the municipality of Tuguegarao. The association is a non-stock, non-profit organization of the so-called centralized type. Its working capital comes directly from the commission it receives from sales of the tobacco crop of its members.

The association has no local units, but it functions through committees, one for each of the thirteen barrios, performing some of the functions that usually devolve upon local units.

The association has a Board of Directors consisting of nine members elected by the committees from each barrio. The members of this Board must be members of the association, except the president, who may or may not be a member and who may also be the manager of the association. Each of the members of the Board is given the power to supervise a district. He may at the same time be a member of the committee from that district. The Board elects its own president, vice-president, secretary-treasurer, and manager. The manager and the secretary-treasurer receive fixed salaries. The other members of the Board are given nominal compensation for their services.

The Board of Directors is assisted by a committee which acts as an advisory body to the central organization. The members of this committee are elected by the members in each barrio, the number of committeemen elected from each barrio depending upon the number of members of the association in that barrio, but in no case should there be less than two members of this committee elected from any one barrio. These committeemen must be members of the association. This advisory committee confers with the Board of Directors on matters pertaining to the administration and management of the barrio organizations.

The barrio units—as they may be called for convenience, as it has been stated that the association has no local units—each has a committee whose members are elected from among the members of the association in that barrio. These committees supervise the work of the members in their respective barrios in the marketing and delivery of the tobacco to buyers. Hence, the members of these local committees should be farmers who are well informed about the classification of the tobacco; they are generally the more advanced and more influential members of the association in the barrios they represent.

According to the report of the Survey Party of the University of the Philippines, the association receives the advice of government agents from the Bureaus of Commerce and Industry, Agriculture, and Internal Revenue. They form the Advisory Board to the Board of Directors of the Association. The Agent of the Bureau of Agriculture advises on matters pertaining to culture and curing of tobacco; of the Bureau of Internal Revenue on classification; and of the Bureau of Commerce and Industry who is *ipso facto* the technical adviser of the association, advises on matters of marketing, transportation, accounting and keeping of books. In case of difference of opinion between the Advisory Board and the Board of Directors, the matter is referred for final decision to the members in a general meeting.

The report of the Survey Party further states that there is a marketing committee composed of the manager as chairman and two other members of the association. The duties of this committee are to study the local market, to approach prospective buyers and report their findings to the Board of Directors or to the members of the association in a general meeting,

as the case may be. This committee draws up rules and regulations governing the actual marketing of tobacco, that is, the details of the negotiations, prices, etc., subject to the approval of the Board of Directors.

Membership of the association is composed of tobacco farmers from thirteen barrios of the town of Tuguegarao, Cagayan. Only two barrios did not register membership in the association. Effort was made to bring all the farmers in each barrio into the association, but there are many farmers in some of these barrios who for various reasons do not desire to become members of the association. These farmers are a constant menace to the activities of the association as they constitute a discordant element in the community toward the activities of the association. The barrios in the municipality of Tuguegarao represented in the organization are:

1. Annafunan
2. Attulayan
3. Bagay
4. Buntun
5. Capatan
6. Caritan
7. Cataggamman
8. Larion
9. Libag
10. Linao
11. Namabbalan
12. Pal-lua
13. Ugag

The two barrios of the municipality which have not yet entered the association are Caggay and Tagga.

The central office of the association is located in the barrio of Annafunan. All business of the association is transacted at or through this central office.

The members residing in the twelve different barrios represented in the association get in touch with the central office of the organization through their respective committees.

CONTRACT BETWEEN THE ASSOCIATION AND MEMBERS

The contract is very important in a co-operative association because it binds each member to the association. It helps the members to see their duties toward their organization and the duties of the association toward them. It is, therefore, important that the terms of the contract be binding and provisions drawn defining the punishment for those who break the provisions of the contract.

Before a farmer can become a member of the Tobacco Growers' Association Inc. of Tuguegarao, Cagayan, he has to sign a contract the most important provisions of which are:

(1) That the signers of the contract are *bona fide* farmers, landowners, or leaseholders who grow or possess tobacco. As members, they agree to follow and abide by whatever rules and regulations the association may prescribe for the marketing of their products in collective and co-operative way with a view to receiving better prices for the members.

(2) The association is empowered to gather the tobacco of the members and sell it according to the classification adopted by the association. If, because of unsuitable place for storing tobacco, the association cannot assemble the holdings of its members, the members are allowed to take care of such holdings in their houses until such a time as they are sold by the association.

(3) The association promises to market the members' holdings at the highest possible prices obtainable, and to pay them the whole proceeds, said prices to be in accordance with said classification. Only such expenses as are absolutely necessary to operate the association and of handling the produce may be deducted from the proceeds of the sales.

(4) The association can sell the tobacco to any company or person offering the best terms.

(5) Any member may sell his tobacco to any tobacco buyer who offers a better price than what the association can get, provided that said member should first get the permission of the association. If the member complied with this requirement and the buyer failed to carry out the provisions of his contract with the member, the association will furnish said member with all necessary legal aid without charge.

(6) Members who violate this provision of the contract will pay a fine of ₱5.00 per quintal of tobacco which he sold without the consent of the association. This is considered as "liquidated damages." Furthermore, members agree to pay the association all its expenses and court fees should judicial proceedings be necessary.

(7) The association can co-operate or join with other similar associations in the formation of a central agency for marketing purposes, and may help in the expenses of said central agency.

—(*Quoted from the report of the Tobacco Survey Party of the University of the Philippines.*)

The study indicates that since the beginning of the business operations of the association there has been only one member who tried to violate article 5 of the contract. This member was lured by the unusually high price offered to him for his tobacco. Apparently he was so eager to accept the terms offered to him by the buyer that he forgot to inform the association that he was going to sell his tobacco himself. He, however, did not succeed in getting the money because the Technical Adviser of the association prevented the consummation of the sale by instituting a complaint in court. His tobacco, which was being hauled to the buyer's warehouse, was seized as a result of this complaint. A court decision was rendered in favor of the association. With this exception, there has been no attempt on the part of any member to violate the provisions of the contract.

The fact that the members abide by the terms of their contracts with the association shows their willingness to co-operate. They realize the benefits derived from co-operative effort.

MEMBERSHIP RELATIONS

Deliveries

As has been stated, the figures used in this study are those based on the result of the business operations of the association in 1925, its first year of existence. During that year, the association delivered to its buyer, the Alhambra Cigar and Cigarette Manufacturing Company, a total of 557,663

palillos of tobacco valued at ₱64,302 and distributed among the thirteen barrios represented in the entire organization as follows:

Barrio	*Amount delivered palillos*	*Value pesos*
Annafunan	171,530	19,274.80
Atulayan	14,198	1,570.72
Bagay	42,752	4,568.55
Buntun	13,737	1,589.86
Capatan	45,510	5,030.30
Caritan	1,550	170.00
Cataggamman	62,352	7,974.05
Gosi	1,900	237.50
Larion	15,600	1,997.00
Libac	87,480	9,996.67
Namabbalan	18,300	2,327.10
Pal-lua	65,474	7,455.20
Ugag	17,270	2,110.40
Total	557,663	64,302.15

The association realized a commission of ₱5,576.63 from the Alhambra Cigar and Cigarette Manufacturing Company for the above sale of tobacco. The total amount delivered to the company by 450 members gave an average of 1,239.25 *palillos* for each member, or an average income of ₱142.89.

The members delivered their own tobacco, individually, at their own expense, but through the association, to the Alhambra Cigar and Cigarette Manufacturing Company. The association prepared a list of the members who delivered their tobacco to the company with the corresponding amounts of the product sold by the individual members. The company made the payment direct to the treasury of the association. After the treasurer received all payments the association delivered to the members their corresponding shares of the money, or the amounts equivalent to the selling price of their tobacco.

WAREHOUSING

The association owned no warehouses at the time when this study was made, but the management was planning to erect some as soon as the association finances warrant it. The individual members kept their produce in their houses or in separate buildings built for this purpose at their own expense.

Warehousing facilities by the association were observed by the writer to be an indispensable factor for the success of the organization. The majority of the members of the association are too poor to provide a place adequate for storing their produce. Consequently, the majority of these farmers place their tobacco in the living room of their houses. If there is not enough room in the one-room bamboo house of the farmer, he places his tobacco under the house. Both of these practices are objectionable,

the first, because it is unhealthful for the farmer and his children to breathe the dust of the tobacco, and the second, because the tobacco thus kept is dirty, filthy.

Recommendation

Inasmuch as the Government is taking an interest in the improvement of the conditions of these tobacco farmers, it should provide funds for the erection of proper warehousing facilities in the tobacco region; particularly, for the use of the marketing associations already organized there. In the opinion of the writer, this is one of the best aids the Government can give to these struggling tobacco planters.

In addition to warehouses, the association should encourage its members to build community curing sheds where they can properly cure and classify their tobacco, thus insuring the turning out of better quality of finished product. This could be done by encouraging each barrio organization to build at least one curing house for the common use of its members. Funds for the expenses of erecting such curing sheds could be raised in the following manner: Charge each member a fixed sum, say ₱5, to be considered as deposit. When the curing house is finished, nominal fees should be charged every member for its use. The members will continue paying such fees for the use of the curing house until the entire amount spent for its erection is recovered. Then, when the association has collected from the members enough money from fees to cover the cost of the curing house, the deposit of ₱5 may be returned to each member. After that no more fees should be collected for the use of the curing shed. Each member could now use the curing house for curing his tobacco free of charge. Other curing sheds, as the need for them arises, could be built under a similar financing method. This would do away with the common practice of curing the tobacco under the houses or near the kitchen.

PRICE AND SALES POLICY

One of the most important problems that confronts a co-operative marketing association is the development of an effective price and sales policy. This responsibility should rest upon the board of directors. The responsibility of formulating a price and sales policy for the Tobacco Growers' Association Inc. of Tuguegarao rests mainly upon the technical adviser of the association. This apparent deviation from the common practice among co-operative marketing associations was perhaps necessary under the conditions in which the association is operating. The members of the Board of Directors of the association are farmers who have had no experience in formulating any definite program for the sales of their product. They have been accustomed to selling their tobacco at prices regardless of quality. They waited for the buyers who fixed the prices for their crop.

There are two prevailing theories as to what constitutes the best price and sales policy for a farmers' co-operative marketing association. One of

these assumes that it is the aim of a co-operative association to effect such control of a product as to enable it to dictate an arbitrary price, without reference to supply and demand conditions. The other theory assumes that an organization cannot maintain prices which are out of line with economic conditions, and that it could only make its members realize the benefits from co-operative effort by the development of a price and sales policy which attempts to adjust supply to market demand.

Apparently the Tobacco Growers' Association Inc. of Tuguegarao has attempted to carry out a price and sales policy based on the theory which assumes that it is the aim of a co-operative organization to effect such control of a product as to enable it to dictate an arbitrary price without reference to supply and demand conditions. The association tried to control the tobacco of its members, refusing to sell it to buyers when prices offered by them were the same as those offered to non-members. This method of sale was adopted by the association in order to combat the usual method of fixing prices for tobacco by the buyers. The association could not effect a policy which assumes that prices depend upon the supply and demand of the product because the scope of its activities covers only a very small portion of the entire tobacco region. Even in the same locality where the association is organized it has to compete with farmers who are not members of the organization. The association, through a vigorous campaign of its officers and advisers, was able to hold the tobacco of its members until an offer was made at prices which were the highest quoted in the province that year.

Prices

One of the objectives of a co-operative marketing association is to get the highest possible price for the product it handles, and to maintain that price once it has obtained it. In order to attain this objective, an association should establish standard grades or classification for its product and should see to it that the members raise as nearly as possible the same quality of that product. This will also necessitate the control of the flow of the same product to market,—a method of marketing known as "orderly marketing." This method requires the holding of the product and the releasing of only that amount demanded at each time by the consumer in order to avoid the overstocking of the market with the same, and to prevent the fall of prices due to oversupply.

By holding over the tobacco of its members, the association was able to get the highest prices offered for tobacco in the province of Cagayan for the crop of 1925. The highest prices received by farmers who are not members of the association were the lowest prices offered for the tobacco of the association that year. The following table shows the prices of tobacco sold by the association according to class and prices received by farmers who

are not members of the organization: The non-members sell their tobacco by the old method, that is, with no relation of price and quality.

Grades	*Per 100 palillos*
Tobacco with 50 per cent clases and 50 per cent menores	₱ 15
Tobacco with 45 per cent clases and 55 per cent menores	14
Tobacco with 40 per cent clases and 60 per cent menores	13
Tobacco with 32 per cent clases and 68 per cent menores	11
Tobacco with 30 per cent clases and 70 per cent menores	10 to 11
Tobacco of non-members in Tuguegarao, Cagayan	4 to 11
Tobacco of non-members in other towns in the province	2.50 to 12
Tobacco in Manila market per quintal	₱16 (1 Quintal = 100 *palillos*)

It is shown by the above table that this Tobacco Growers' Association, like all other co-operative marketing associations, tries to standardize prices of its product according to its own method of classification. With the first year's experience of the members in selling their tobacco according to quality, they began to realize that better grades of tobacco bring higher prices than poorer ones and that there is a decided advantage in selling their product at prices corresponding to the different grades instead of selling the whole product regardless of its quality. According to an item published in *The Philippine Tribune* on March 23, 1927, the association received for its tobacco crop of 1926, prices ranging from ₱9.00 to ₱10.50 per quintal, whereas non-members received about ₱8.00 per quintal for tobacco of the same quality as that sold by the association.

It should be remembered that the fixing of prices is not done by the tobacco farmers but by the well organized companies buying the product. It appears, however, that the association, although still very young, has been able to influence somewhat the fixing of prices for its own product. If this association is given the proper support both by the government and the farmers its influence in the fixing of prices in the future may become wide.

Knowledge of customers

Personal acquaintanceship and contact with customers are important factors of successful merchandising. These lead the merchant to understand the needs and psychology of his customers. Knowing these, the merchant can better adjust his products to suit the demand of his customers. The Tobacco Growers' Association, through its technical adviser and the members of its marketing committee, has done a great deal toward becoming acquainted with the personnel of the companies and private persons interested in buying tobacco. It is believed that through the efforts of these officers of the organization more could be done in this direction to the end that "customer-preference", which is very essential in merchandising, may be strengthened.

Terms and method of sale

The association, through its marketing committee, looks for prospective buyers. The members of this committee go to the different buying companies and tell them about the quantity of tobacco the association is ready to sell and at the same time ask them how much they can offer and what quantity they can buy.

Upon learning that the association has tobacco to sell, these companies send out agents to see the tobacco. Then bargaining begins. The company offers to buy all the tobacco of the association; provided the prices offered by all the buyers differ but slightly, the bargain is closed. A contract is drawn between this company and the association. This contract includes the amount of tobacco bought, prices, the date and manner of delivery, reclassification of improperly classified tobacco, payment for product and commissions by the company to the association. This contract is signed before a Notary Public by the president of the association or by its technical adviser and the Representative of the company. Witnesses for both parties are also required to sign the contract.

Before the delivery of the product, the company sends out agents to approve or disapprove the classification of the tobacco by the farmers. If any classification is disapproved by these agents reclassification is immediately made to conform with the decision of the committee of arbitration as explained in the first part of this paper. When everything is settled regarding classification, deliveries begin.

The members deliver their product individually at their own expense. A careful record of the delivery by each member according to grades is made by the secretary of the association. The treasurer refers to this record when payments to members are made. During the deliveries there must be present in the warehouses of the company representatives of the association and the company to check the tobacco delivered by each member and to see that no cheating on either side takes place. After the deliveries, payment is made direct to the treasury of the association.

Then, distribution of the money to the members follow. As there are thirteen barrios composing the entire organization, it takes time to make payments to all members. The treasurer makes the payments in the following manner: A meeting of all members in one barrio is called. The treasurer distributes to the members their corresponding shares of the money. Then he goes to the other barrio and repeats this procedure until he has distributed all the proceeds of the sales to all members who sold their tobacco through the association.

Financing

The greatest handicap of the association is the absence of a bank from which the members could get loans for buying supplies while awaiting the buying season for tobacco. Tobacco is a commodity which requires a

long period of preparation after harvest. The farmers have to cure, ferment, and classify their produce before they are able to offer it for sale. This takes from two to three months. Besides, the buying season for the crop is fixed. It starts usually in July and ends about the middle of November. This means that the farmers have to wait from April to November, or seven months from the time they harvest to the end of the sales season, before they can get the money for their tobacco. While these farmers wait for the sales, they are forced to borrow money from persons who charge them usurious rates of interest. At times they cannot pay these loans in cash and instead they have to pay them in tobacco which may be many times the value of the loans.

The association has been helping its members out of this difficulty. It charges each member ₱0.20 as membership fee and ₱2.00 annually as maintainance fee. The membership fee is used for incidental expenses of the central office while the maintainance fee is used for financing a weekly published in Ibanag, the local dialect of the farmers. If there is any amount not used out of these fees after taking care of these expenses, the association uses the money for buying supplies needed by the members and selling these at cost to them. The association also encourages more well-to-do members to sell to it any surplus corn they may have. In turn, the association sells this to the needy members on credit. The cost of this corn is deducted from the money realized by these members from the sales of their tobacco.

The association being a non-stock organization raises money whenever occasion for it demands, by requiring each member to contribute a fixed sum. This is the manner by which the association raised funds for erecting the office building and buying the office equipment and supplies.

No amount is retained by the association from proceeds of sales of the tobacco of its members. The individual members take care of the expenses in marketing their tobacco and in preparing same for market. This should be the work of a co-operative marketing association in order to effect economy in marketing operations; but this association was not in a position to do this. It had not the funds necessary to finance the marketing. It could not exact from its members enough money for this purpose because the majority of them are too poor to pay a heavy contribution. The organization, however, plans to take over this work from its members as soon as its finances warrant. The members will have to wait for some years before they will be able to make use of the association in this connection.

Besides the fees collected from its members, the association accumulates money from commissions from companies buying its product and uses this fund for loans to members at nominal rates of interest.

COST OF OPERATION

The subject of costs is the thing that provokes heated discussions in a co-operative marketing association. This is because the members always

want to know where the money they contribute to the association goes, or how it is spent.

The experiences of this association along this line were not available. The association does not keep any record of expenses for marketing operations, because the individual members do not keep records of their expenses, and expenses for the marketing of their crop were borne by them individually. This method of financing the marketing operations of the association was thought to be the best plan under the existing conditions as the organization started its business operations with no funds. And it was deemed unwise to ask the members at the very start to contribute adequate cash for defraying these marketing expenses. Few had surplus money and there was the danger of arousing suspicion among the members if at the beginning the association exacted large amounts of contributions from them. They might think that the association was established only for the purpose of getting money from them without first showing them the advantages they could derive from membership in the organization.

DIFFICULTIES IN THE ACTIVITIES OF THE ASSOCIATION

As with other young organizations, the Tobacco Growers' Association of Tuguegarao, has met and is still meeting many difficulties in carrying out its activities. This study shows that the association has had to deviate from some of the well-established principles of successful co-operative marketing associations in order to meet conditions existing in the locality and to keep within the intelligence and experience of the farmers. For example, the association does not retain any of the money it receives from sales of the tobacco of its members. Co-operative associations elsewhere do, for by so doing the members feel that they are part and parcel of the organization and that it cannot function without their financial support. Also the co-operative spirit among the members is strengthened because they feel that all of them are for the association and the association is for all of the members. But the Tuguegarao association could not have this feature as yet, because of the prejudice of the members against associations of this character. They cannot readily grasp the sound motive for exacting from them certain amounts of money to support their organization. They will have to be shown material benefits derived from their connection with the association before they can be convinced of the importance of running the organization at their own expense. Again, the association does not handle the financing of the actual marketing of tobacco of its members. It leaves this work to the individual members themselves. Economies could be effected if the association took care of this work, but it could not do so because the members would not readily agree to such a proposition. They would stick to the old method of bringing their product to the buyers because they are accustomed so to do. A sudden change from this old practice would not meet the approval of the farmers. The association

has to go slow in introducing new methods or principles no matter how sound they may be into the business of these tobacco farmers.

In the beginning, the association planned to eliminate entirely the middlemen from the field of marketing. The middlemen were aware of this and they tried hard to prevent the association from carrying out its plans. They devised all kinds of ways to obstruct the progress of the business activities of the organization. When a company offered to buy the tobacco of the association, they would go out to the members and offer them prices higher than those offered by the company in order to destroy their faith in the organization. They would threaten the members telling them that the association was only a bluff and that it was organized just so that the organizers would get the benefit out of the help of the members.

Successful co-operative associations elsewhere discovered that it is impossible for them to entirely eliminate the services of the middlemen. They found that this is one of the limitations of the activities of any co-operative marketing organization. What an association could do is not to entirely eliminate the middlemen from the field of marketing but to integrate the processes of marketing—bring a succession of steps under one control. This would eliminate the services of unnecessary middlemen and would bring economies in the management. The expenses for the services of such unnecessary middlemen could be diverted to increase the profits of the farmers. Like other co-operative marketing associations, the Tobacco Growers' Association of Tuguegarao discovered the futility of trying to eliminate the middlemen from the field of tobacco marketing. When the association found that the middlemen were antagonistic toward the business progress of the organization, the Board of Directors of the association, through the advice of its technical adviser, changed its policy in dealing with these middlemen. Instead of ignoring them, the association tried to gain their support by asking them to help the organization look for buyers and thus get a share of the commission, or persuaded them not to meddle with the affairs of the association. This support was accomplished to some extent through tact on the part of the technical adviser and other officers of the organization. During the latter part of the year of 1925, the association found no difficulty in dealing with these middlemen who at the beginning of the business operations of the organization had been campaigning vigorously in order to obstruct the progress of the society.

Due to lack of men who are experienced in business, the association had to accept the election of inexperienced men to its Board of Directors. This led the association, in the beginning, to be in trouble with local politicians who are interested in the tobacco business. These politicians tried to prevent the association from getting members by discouraging farmers from joining the organization. The association should try its best to employ as manager a man who is experienced in the tobacco business even if it has to pay a high salary for the services of such a man. In the long run it

would be cheaper to hire such a man than to employ an inexperienced manager at low salary.

HOW MEMBERS HAVE BENEFITED

As has been stated, this study is based on the first year's business experience of the association. It is, therefore, not just to draw conclusions from this short experience of the organization. However, the facts and experiences of the association in its initial activities may be of some value to those who are interested in co-operation.

It took the government agent more than two years to study local conditions and come in personal contact with the farmers and become familiar with the communities before he could organize the association. At the time this attempt at co-operation was launched, prejudice was rampant throughout the valley against associations of this character because of failure of former attempts in this direction.

But some beneficial results were attained by the association. It sold the tobacco of its members at the highest prices paid for tobacco in Cagayan during the year. It was able to realize from these sales a commission of ₱5,576.63. It helped its members out of their financial difficulties by giving them loans from the money it accumulated from commission at rates of interest very much lower than those offered by any commercial banks or money lenders. It has stopped, to some extent, the practice of usurers in taking advantage of the helpless financial situation of the farmers in lending them money payable in tobacco. It has showed the services of middlemen to be superfluous and that their earnings could be diverted to increase the farmers' profits. It has helped the farmers, too, in selling them supplies at cost. It has established a weekly newspaper published in the local dialect, the aim of which is to educate the farmers on lines of rational farming and acquaint them with the activities of the organization. Above all, the association has aroused the interest of the tobacco farmers of the Cagayan Valley in co-operative movement, a thing which may lead in the future to a comprehensive co-operative organization of tobacco growing regions of the Islands, for the sole purpose of marketing this crop.

The Tobacco Growers' Association of Tuguegarao is yet in its infancy. The results obtained in this study cannot be used as a basis for judging the efficiency of the organization. If all the tobacco farmers in the Cagayan Valley could be organized into several local associations and then a federation of these associations be established, then, the tobacco farmers would be able to wield a powerful influence in the fixing of prices for this commodity, if they could not entirely control marketing prices.

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THE COST OF RAISING PULLETS UNDER CONDITIONS EXISTING IN THE COLLEGE OF AGRICULTURE[1]

PEDRO S. PAJE

WITH ONE CHART

INTRODUCTION

The success of poultry farming as a business depends to a great extent upon the cost of production of the particular products. In poultry raising, if the cost of keeping poultry is analyzed it will be found that it is distributed among four principal groups. These are: (1) feed cost, (2) labor cost, (3) cash expenses, and (4) capital charges.

The cost of raising pullets is one of the largest items in poultry production, and facts about this item may answer some of the common questions of our poultrymen.

Review of literature

Resananda (1924) who worked in this College reported that the average cost of hatching Cantonese eggs was ₱0.19 per chick produced. As to the cost of raising pullets, however, no investigation has been conducted and published in this country.

Brown (1905) conducted experiments similar to this from the results of which he concluded that the average cost per bird, from egg to maturity, ranges from 15.42 cents (₱0.3084) with cross breeds; to 17.32 cents (₱0.3464) with Wyandottes. The cost of feed per pound (0.45 kgm.) of grain was practically the same for all birds, averaging around 6.6 cents (₱0.132). Withycombe (1905) reported that from 100 eggs set, 75 chickens were raised. He found also that in spite of the high cost of feed, the flock gave a profit of 180 per cent on the original investment of $15.00 (₱30.00). His conclusion was that a small flock of poultry may be profitably kept under confinement, and that early hatched pullets are more profitable than those from late hatches. Graham (1909) reported that with chicks hatched in May and September, raised in a pasture, 345 consumed 4,304 pounds (1,956.4 kgm.) of grain. The cockerels were removed when they weighed about 3½ pounds (1.59 kgm.) each, and the breeding stock was taken from the pasture in October. On the other hand, 773 chicks hatched at

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different times and raised in an orchard consumed 8,649 pounds (3,926.8 kgm.) of grain. He further reported that it costs from five to seven cents (₱0.10—₱0.14) to hatch the chicks. Philips(1916) found that the cost of a White Leghorn pullet up to the time of laying varied largely with feed prices. The average cost of raising White Leghorn pullets was 43.4 cents (₱0.868). When the profit from the cockerels was credited, the net cost of the pullets varied from 24.3 cents (₱0.486) to 50.5 cents (₱1.01), the average being 38.1 cents (₱0.762). In these experiments he found also that 457 eggs were necessary to raise 100 pullets. Another investigator, (Anonymous, 1914) reported on chicks for the early part of the growing period and found that this is the most expensive period of production. The cost of feeds during this period exceeded one-half the lowest market price which was usually 16 cents (₱0.32) per pound (0.45 kgm.) live weight for prime young stock. Gray (1916) in a similar experiment found that with mixed breeds, it cost slightly over 8 cents (₱0.16) to produce profits. Still another investigator (Anonymous, 1915) stated that the feed cost was less when the chicks were hatched and reared artificially than when hatched naturally, as in the latter case, cost of feeding the mother hen was charged against the chicks.

Objects of the experiment

The main object of the present experiment was to determine the cost of raising Cantonese pullets under conditions existing in the College of Agriculture. The secondary objects were: (a) to find the amount of feed consumed at different ages under a liberal feeding system, and (b) to find whether or not poultry raising under these conditions is profitable.

Time and place

The experiment was conducted in the Poultry Division, Department of Animal Husbandry, College of Agriculture, Los Baños. The first part of the experiment was from December 15, 1924 to October 15, 1925. The second part was carried on from December 15, 1925 to October 11, 1926.

MATERIALS

As recommended by Leoncio (1924) only eggs which were not more than ten days old were used in this experiment. Cantonese eggs were used. Incubators, brooders, a nipa poultry house, and yards were used in the raising of the chicks. Feeds and other equipment including those already mentioned were all supplied by the Department.

The feeds given to the birds were grain, mash, eggs, and common salt. Besides these feeds they had plenty of green grass at their disposal. The grain consisted of cracked corn and palay. The mash was composed of shrimp, corn meal, copra meal, rice bran, and salt. During the first four weeks infertile eggs were used to wet the corn meal given as grain or the mash.

EXPERIMENTS AND RESULTS

Plan of the experiment

The experiment was conducted for two successive years. Three hatches were made, one in December, one in February, and one in April in each year. Data of the results during the first year were disregarded, except those during the incubation. The preliminary part of the experiment enabled the writer to learn the practical side of the work, especially as to the management, care, and feeding of the chicks.

The birds were given the same treatment and raised under practically the same conditions. The feeds were weighed weekly. The initial weights of the chicks were taken at one day old, and from one week old they were weighed weekly for two months, then every second week for two more months, and monthly thereafter till the end of the experiment.

The males were separated and turned over to the Department after they were twelve weeks old and their value had been properly credited. At the end of the experiment the pullets were culled. Those selected were considered as breeding pullets and the rest were sold as table fowls.

Incubation and brooding

The eggs were all incubated in two hot-water Queen incubators (250 and 130–egg capacity). The kerosene consumption, incubator eggs removed, and the time spent for each hatching were carefully recorded.

When the chicks were hatched, they were brooded in a portable brooder house (3.6 m. × 3.3 m.) with a 500-chick Queen charcoal-burning brooder. The chicks were not allowed to go out from the brooder house until they were three days old, then they were allowed to do so only during the warmer part of the day. Within the yard, the chicks had enough exercise and much green feed in the form of grass. During the first 10 days the brooder was kept heated day and night. After that it was run only from six o'clock in the evening to about seven o'clock the following morning, except on rainy days when the chicks needed heat to keep them warm. They were kept under this condition until they were twelve weeks old, then they were put in the poultry house where they were raised till maturity.

Feeding, care, and management

The chicks were not given feed during the first twenty-four hours after hatching. The second day they were given corn meal moistened with infertile eggs. They were fed five times daily. One egg was allowed for every thirty chicks. Beginning the fourth day of the first week they were

allowed all the dry mash they wanted. After the second week, the chicks were given dry corn meal morning and afternoon and mash moistened with eggs twice a day. Dry mash was given the same as during the first week. When the chicks were four weeks old, the same procedure of feeding as given above was followed except that the mash was moistened with water instead of eggs and was given only once a day. The grain was a mixture of cracked corn and palay and was given morning and afternoon. Plenty of fresh green grass was available at all times. This procedure of feeding was followed until the end of the experiment.

The feeds were prepared weekly and the proportion (by weight) was varied according to the age of the birds. The mash was a mixture of one part shrimp, two parts copra meal, three parts corn meal, four parts rice bran, and one per cent common salt of the total mixture.

At the age of four weeks the grain given was a mixture of corn meal and cracked palay in the proportion of 1:1. The proportion of the mash was not changed until the chicks were six weeks old, when the proportion of the corn meal and copra meal was interchanged.

The grain mixture remained the same until the end of the experiment, except that a mixture of cracked corn and whole palay was given when the birds were large enough for these. From the fifteenth week, the mash mixture was again changed to one part shrimp, one part corn meal, two parts of copra meal, and three parts rice bran. The proportion of the mash was not changed again.

The birds were reared in a yard with plenty of grass. Occasionally, some pieces of wood were placed in the yard to attract white ants (*anay*), and these were exposed once in a while so the birds could get at the insects.

During the brooding period the chicks were yarded in a place protected by shade trees. These not only gave them comfort, but saved them oftentimes from their enemies, especially hawks.

Within the period of rearing, the growing chicks were closely observed. Any sign of weakness or disease in the flock was immediately given proper attention.

Man labor was not the only kind needed; animal labor was used in hauling feeds and litter for bedding from neighboring rice mills. Any amount of labor involved in the course of the experiment was properly credited.

Prices

The prices of feeds, common salt, eggs, breeding and table fowls, charcoal, and transportation were furnished by the Animal Husbandry Department of the College of Agriculture. Price of kerosene was furnished by the Property Office and of man labor by the student Labor Office of the College.

The average prices of the grain and mash mixtures were also computed (see table 1).

TABLE 1

Shows the actual prices of the different items used in the experiment

ITEMS	UNIT	PRICE
		pesos
Palay	kilogram	0.115
Corn	kilogram	0.0876
Shrimp, dried	kilogram	0.229
Corn meal	kilogram	0.100
Copra meal	kilogram	0.0696
Rice bran	kilogram	0.059
Salt (N_aCl)	kilogram	0.029
Grain mixture	kilogram	0.1013
Mash mixture No. 1	kilogram	0.0893
Mash mixture No. 2	kilogram	0.0867
Mash mixture No. 3	kilogram	0.0995
Charcoal	kilogram	0.067
Kerosene	can	2.57
Hatching eggs	hundred	10.00
Infertile eggs	one	0.02
D_1, D_2 and D_3[a]	one	0.01
Table fowl	kilogram	
Matured fowl	kilogram	0.85
Broilers	kilogram	1.20
Breeding pullet	one	2.50[b]
Man labor	hour	0.12
Transportation	hour	0.35

[a]Fertile eggs that died during the first, second, and third weeks, respectively.

[b]The price for which Cantonese breeding pullets are sold by the Department.

Results

The net cost of hatching 100 chicks, as shown in table 2, varies from ₱23.15 to ₱25.91. The average was found to be ₱24.26 per 100 chicks or around ₱0.24 per chick. This is higher than that found by Resananda (1924), which was only ₱0.19 for each Cantonese chick hatched. The cost of fuel and labor was not influenced by the number of eggs set.

Table 3 shows the average consumption per 100 birds by the week. The total consumption of feeds per 100 birds from the time they were fed to 24 weeks old was 264.01 kilograms of grain, 269.69 kilograms of mash, and 94 infertile eggs.

Table 4 shows the amount and cost of feed and fuel at different ages. Under the column "Average total cost per 100 birds," the cost from 4–8 weeks was lower than from 1–4 weeks.

Without deducting the cost of cockerels and the eggs laid by the pullets, as some of them matured before the experiment was closed, and adding the DISTRIBUTED charges, the total cost of producing 100 pullets to maturity was found to be ₱66.28 or an average of ₱0.66 per pullet. The chart shows the total cost of feed, labor, and average cost per 100 birds.

Table 5 shows the cost of rearing the pullets and cockerels up to the age of 12 weeks. It was found that it costs about ₱0.54 a bird.

Tables 6 and 7 show the value of cockerels at three months old and the value of the breeding and the culled pullets at maturity. The average value of cockerels raised from every 100 chicks at 12 weeks old is ₱18.88, that of pullets at 24 weeks old is ₱77.98.

The summary of all the results of the experiment shows the total proceeds to be ₱376.39; deducting the total expenses, which amounted to ₱282.94, gives a net profit of ₱93.45.

Table 8 gives the summary on cost of production expressed in percentage.

DISCUSSION OF RESULTS

Cost of hatching

The cost of hatching chicks is determined primarily by: (1) cost of the hatching eggs, (2) cost of fuel, (3) cost of labor, and (4) the DISTRIBUTED charges which include interest, depreciation, and rent. The average cost of kerosene used a day was found to be about ₱0.10. Resananda (1924) found it to be ₱0.09. He found also that the depreciation, including the rent and interest was ₱0.47 a hatch. This latter figure was used in this paper in finding the incubator depreciation and interest charges.

The cost of hatching 100 chicks varied slightly in the three different hatches. In table 2 it will be noted that the highest cost was during the April hatch when the percentage of hatch was the lowest. The cost of labor and fuel was nearly constant, for whether the 250–egg capacity incubator is filled or not, the amount of time and fuel spent will be almost the same. The average cost of hatching 100 chicks is ₱24.26 or about ₱0.24 a chick. So that if the chicks were sold at ₱0.25 each, which is the College price for a day-old Cantonese chick, there will be a gain of one centavo. The cost of a day-old chick is higher than that found by Resananda (1924), ₱0.19. The reason is that hatches were made at different seasons of the year, hence the percentage of hatches varied. The lower the percentage of hatch, the higher is the cost of hatching the chicks. Table 2 shows the computed average cost of hatching 100 chicks. The total cost of hatching 387 chicks was ₱93.50.

TABLE 2

Cost of hatching

TIME OF HATCHING	EGGS SET		INCUBATOR EGGS[a]		COST OF FUEL AND LABOR	DISTRIBUTED CHARGES	TOTAL NET COST	NUMBER OF CHICKS HATCHED	NET COST PER 100 CHICKS
	Number	Cost	Number	Value					
		pesos		*pesos*	*pesos*	*pesos*	*pesos*		*pesos*
December	255	25.50	81	1.43	3.71	0.47	28.25	122	23.15
February	345[b]	34.50	184	2.43	4.23	0.70	37.00	156	23.72
April	265	26.50	152	2.19	3.47	0.47	28.25	109	25.91
Total	865	86.50	417	6.05	11.41	1.64	93.50	387	24.26[c]

[a] Candled eggs after first and second week of incubation including those that did not hatch.
[b] Two incubators were used during the first 14 days, then all eggs remaining were placed in one incubator.
[c] General average.

Average amount of feed consumed at different ages

The birds were hand-fed, care being taken not to over-feed them. They went to roost, however, with full crops. By this method of feeding, the birds were kept busy searching for bugs, insects, and worms, and were also induced to eat plenty of green grass. In this way they had ample exercise every day. Table 3 shows the amount of feed consumed at different ages per 100 birds.

TABLE 3

Amount of feeds consumed at different ages

AGE	TOTAL NUMBER OF BIRDS	TOTAL CONSUMPTION			CONSUMPTION PER 100 BIRDS		
		Grain	Mash	Egg	Grain	Mash	Egg
weeks		*kgm.*	*kgm.*	*number*	*kgm.*	*kgm.*	*number*
1	369	5.0	7.0	84	1.35	1.89	23
2	361	6.5	11.5	84	1.80	3.19	23
3	353	10.8	13.0	84	3.06	3.68	24
4	351	11.3	16.1	84	3.22	4.58	24
5	348	12.4	19.3	—	3.56	5.54	—
6	343	14.6	23.0	—	4.26	6.70	—
7	341	18.7	25.0	—	5.48	7.33	—
8	340	21.4	25.8	—	6.29	7.59	—
9	337	24.2	26.7	—	7.18	7.92	—
10	336	28.0	29.9	—	8.33	8.89	—
11	336	33.9	33.0	—	10.09	9.83	—
12	336	34.9	33.9	—	10.38	10.09	—
13	167[a]	19.0	17.0	—	11.38	10.18	—
14	166	20.2	18.5	—	12.17	11.14	—
15	166	22.0	20.5	—	13.24	12.35	—
16	166	24.0	21.7	—	14.45	13.07	—
17	166	25.7	23.3	—	15.48	14.04	—
18	166	27.5	26.5	—	16.57	15.96	—
19	166	28.8	28.8	—	17.35	17.35	—
20	166	29.7	29.7	—	17.89	17.89	—
21	166	31.3	31.3	—	18.85	18.85	—
22	166	32.8	32.8	—	19.76	19.76	—
23	166	34.0	34.0	—	20.48	20.48	—
24	166	35.5	35.5	—	21.39	21.39	—
Tota l	——	552.2	583.8	336	264.01	269.69	94

[a] Cockerels removed.

The average consumption of mash per 100 birds from the first to the tenth week was generally higher than that of grain. The reason for this was that the chicks were given enough of the mash to start them growing well. From the eleventh week to the eighteenth week, the average consumption of grain by the same number of birds was a little more than that of mash, thus supplying the birds enough heat and energy and protein for growth. From this time on the consumption of mash and grain was made practically the same. At the end of 12 weeks, a total of 167 cockerels had been removed and the consumption was naturally decreased.

Total amount and cost of feed and labor and fuel

The cost of feed, labor, and fuel are three big items in the raising of the pullets. The average cost per 100 birds at certain age and the total cost of feed, labor, and fuel from hatching to maturity are shown in table 4.

TABLE 4

Total amount and cost of feed, labor, and fuel

AGE IN WEEKS	TOTAL NUMBER OF BIRDS	FEED		LABOR[a]		FUEL		COST PER 100 BIRDS			TOTAL COST PER 100 BIRDS
		Amount	Cost	Amount	Cost	Amount	Cost	Feed	Labor	Fuel	
		kgm.	*pesos*	*hrs.*	*pesos*	*kgm.*	*pesos*	*pesos*	*pesos*	*pesos*	*pesos*
1–4	369	81.2 336[b]	14.27	46.0	5.65	98.7	6.61	3.87	1.53	1.79	7.19
4–8	348	160.2	15.20	37.0	3.67	11.3	0.76	4.37	1.05	0.22	5.64
8–12	336	244.5	22.96	39.0	4.91	——	——	6.83	1.46	——	8.29
12–16	167	162.9	15.36	37.0	3.67	——	——	9.20	2.20	——	11.40
16–20	166	220.0	22.00	37.0	3.67	——	——	13.25	2.21	——	15.46
20–24	166	267.2	26.72	37.0	3.67	——	——	16.09	2.21	——	18.30
Total.		1136.0 336[b]	116.51	233.0	25.24	110.0	7.37	53.61	10.66	2.01	66.28

[a] Includes man labor and transportation.

[b] Number of incubator eggs used.

Of the total amount of feed consumed, 552.2 kilograms were grain and 583.8 kilograms were mash. The number of eggs consumed was 336 and the amount of salt was 5.82 kilograms. The total cost of the feed consumed by the birds was ₱116.51.

Comparing ₱0.66, the cost of raising a pullet to maturity as found in this experiment with 43.4 cents (₱0.87) the cost reported by Philips (1916), the cost of producing pullets under local conditions, College of Agriculture, is lower by ₱0.21. The difference may be attributed largely to the kinds

of feeds given, the price of the feeds, and cost of labor, rather than to difference in conditions of the places where the birds were raised.

The pullets or cockerels at the age of 12 weeks may be sold at a reasonable profit for breeding, or as broilers. Table 5 shows the cost at the age of 12 weeks of producing the pullets and cockerels.

TABLE 5

Cost at 12 weeks old of producing the birds

ITEMS	TOTAL COST	COST PER 100 BIRDS
	pesos	*pesos*
Cost of hatching	93.50	27.83
Cost of feeds	52.43	15.60
Cost of labor	14.23	4.23
Cost of fuel	7.37	2.19
Distributed charges [a]	4.53	4.53
Total	172.06	54.38

[a] Includes interest and depreciation on the entire capital which was not affected by the number of birds.

Table 5 shows that the total cost of producing a 12-week old pullet or cockerel is about ₱0.50. At this age, the pullets and cockerels weighed on an average, 0.38 kilograms; if sold as broilers at ₱1.20 a kilogram they would bring ₱0.46. But if they are sold for breeding at ₱1.50 each, the net profit will be ₱1.00 per bird. However, a wise poultry-man will not sell his cockerels at this age as broilers, but will raise them for capons so as to get more profit from them. Usually pullets raised properly turn out to be good pullets, hence few pullets are culled from a flock for table use.

The chart clearly shows the curves of the average cost of production, feed, and labor of 100 birds at different ages. The curve for the average cost of production and that of the feed cost are almost parallel, while that of labor dropped a little from the 4–8 weeks period and increased a little from the eighth week to the sixteenth week, then maintained its level up to the twenty-fourth week.

Cost of pullets and cockerels

The raising of cockerels with the pullets until their sex can be recognized is unavoidable, until the scientific methods being developed at present can become popularized. According to Shoup (1918) it is impossible to buy

only pullet chicks or to select eggs which will produce only pullets, so that the cockerels are a necessary evil in the raising of pullets. Tables 6 and 7 show the total cost of breeding and culled pullets and cost of the cockerels after three months old.

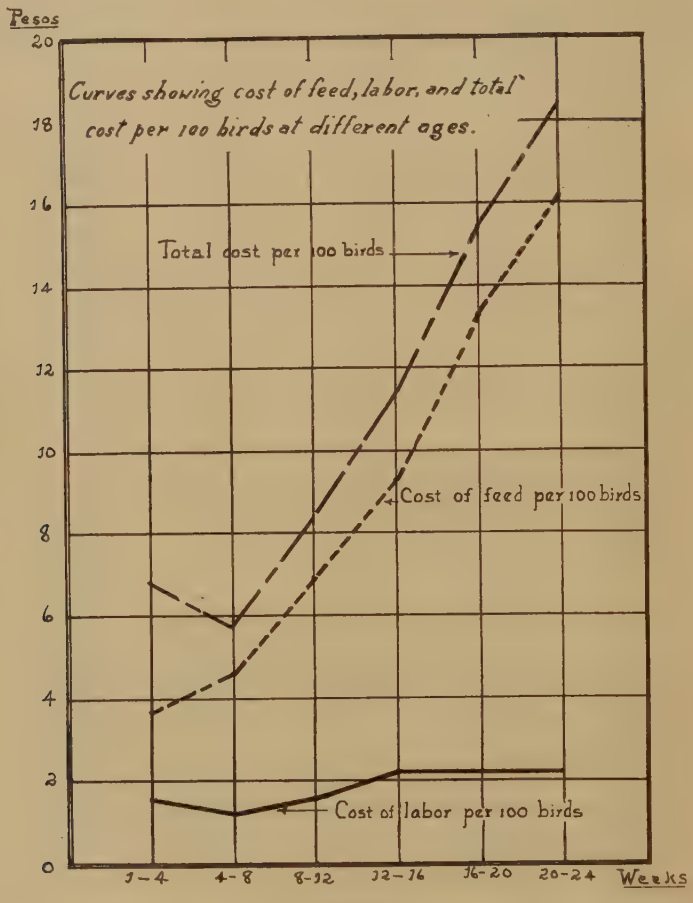

TABLE 6

Value of cockerels at 12 weeks old

TIME OF HATCHING	NUMBER OF CHICKS HATCHED	NUMBER OF COCKERELS	TOTAL WEIGHT	AVERAGE WEIGHT	TOTAL VALUE AT ₱1.20 A KGM.	VALUE OF COCKERELS RAISED FROM EVERY 100 CHICKS
			kgm.	*kgm.*	*pesos*	*pesos*
December.....	122	62	22.57	0.364	27.08	22.10
February.....	156	60	20.64	0.344	24.77	15.88
April.....	109	45	17.68	0.393	21.22	19.47
Total.....	387	167	60.89	0.367[a]	73.07	18.88[b]

[a] General average.

[b] Value of cockerels raised from every 100 chicks based on the total number of chicks and total value of cockerels.

TABLE 7

Value of pullets at 24 weeks old

TIME OF HATCHING	NUMBER OF CHICKS HATCHED	NUMBER OF PULLETS	SELECTED PULLETS		CULLED PULLETS			TOTAL VALUE	VALUE OF PULLETS RAISED FROM EVERY 100 CHICKS
			Number	Value at ₱2.50 each	Number	Total weight	Value at ₱0.85 a kgm.		
				pesos		*kgm.*	*pesos*	*pesos*	*pesos*
December	122	46	32	80.00	14	11.88	10.10	90.10	73.85
February	156	72	48	120.00	24	20.59	17.50	137.50	88.14
April	109	48	22	55.00	26	22.58	19.19	74.19	68.06
Total	387	166	102	255.00	64	55.05	46.79	301.79	77.98[a]

[a] Value of pullets raised from every 100 chicks based on the total number of chicks and total value of pullets.

The separation of the cockerels from the pullets gave the latter more room for growing and freed them from being annoyed by the aggressive vigorous cockerels. The value of the cockerels at the age of 12 weeks was ₱73.07 and the total value of all the pullets when 24 weeks old was ₱301.79. The value of twelve weeks old cockerels and twenty-four weeks old pullets raised from every 100 chicks was found to be ₱18.88 and ₱77.98, respectively.

SUMMARY OF RESULTS

The details of the results of the experiment are summarized as follows:

(a) Receipts:

102	breeding pullets at ₱2.50	₱255.00
64	culled pullets (55.05 kgm.) at ₱0.85 per kgm	46.79
167	cockerels as broilers (60.89 kgm.) at ₱1.20 per kgm	73.07
51	eggs[a] (under sized) at ₱0.03	1.53
	Value of manure[b]	.....
		₱376.39

(b) Expenses:

Cost of hatching 387 chicks	₱93.50
552.2 kilograms of grain feed at average price, ₱0.1013	55.91
583.8 kilograms of mash feed at average price, ₱0.092	53.71
5.82 kilograms of common salt at ₱0.029	0.17
336.0 infertile eggs at ₱0.02	6.72
233.0 hours labor and transportation	25.24
110.0 kilograms charcoal at ₱0.067	7.37
Capital charges:	
Interest on investment on hatching eggs (₱86.50) for 9 months at 5 per cent per annum	3.24

[a] A few pullets laid eggs before they reached the age of 24 weeks.

[b] Value of manure credited for green feed.

Interest on cost of 1 coal burning brooder and 1 brooder house (₱197.50) for 6 months at 10 per cent per annum	9.84
Depreciation at 10 per cent per annum	9.84
Interest on cost of 180 meters fencing (₱56.00) for 9 months at 10 per cent per annum	4.20
Depreciation at 10 per cent per annum	4.20
Interest on cost of poultry house (₱30.00) for 9 months at 10 per cent per annum	2.25
Depreciation at 10 per cent per annum	2.25
Interest on the land used (50 m. × 40 m.) (Valued ₱60.00) for 9 months at 10 per cent per annum	4.50
Total expenses	₱282.94

(c) Net Income:

Gross receipts	₱376.39
Total expenses	282.94
Net income	₱93.45

The value of the manure was considered enough to pay for the value of the green feed eaten by the birds.

It is interesting to note that out of 387 chicks, 167 cockerels raised to three months old, and 166 pullets to maturity, a period covering almost ten months, gave a net profit of ₱93.45. The amount of labor spent a day averaged only 1.7 hours. It was found also that to raise 100 pullets one needs 521 eggs. The total expenses in the raising of 166 pullets to maturity was ₱282.94, and the value of the cockerels when 12 weeks old was ₱73.07. Deducting this from the total expenses of raising the pullets, the net cost of raising 166 pullets was 209.87 or ₱1.26 per pullet.

Table 8 shows the principal items involved in the raising of the pullets.

TABLE 8

Summary on cost of production

ITEMS	TOTAL COST	
	pesos	*per cent*
Cost of hatching 387 chicks	93.50	33.05
Cost of feeds	116.51	41.18
Cost of labor and transportation	25.24	8.92
Cost of fuel	7.37	2.60
Distributed charges	40.32	14.25
Total	282.94	100.00

By reference to table 8 it may be seen that the three largest items involved in the cost of production of the pullets were: (1) cost of hatching the chicks, (2) cost of feeds and (3) capital charges comprising 88.48 per cent of the total cost of raising the pullets. In spite of the low percentage of hatch, the net profit is 21.73 per cent on a total investment of ₱430 and

109.3 per cent on the investment of ₱86.50 on hatching eggs. Comparing the latter figure with that of Withycombe (1905), which was 180 per cent, the margin of difference is rather large. This difference may be due to the difference in local conditions, which may include (1) feed prices, (2) cost of labor, (3) cost of fuel, (4) breed of chicken used, (5) market value of products, (6) time of hatching, and (7) method of raising the birds, or more likely, to method of computation.

Some factors affecting production

The principal factors that affect the raising of poultry are (1) prices of feeds, (2) percentage of hatch, (3) mortality, (4) diseases, (5) poultry enemies, (6) feeding, care and management, and (7) climatic conditions.

The prices of feeds as given under "Prices" are probably much higher here than in other parts of the Philippines. The average percentage of hatch was rather lower than what was expected. However, it was fair. So far as diseases and enemies of the chickens are concerned, the birds did not suffer from them as they were protected as much as possible by proper management and care. As to climatic conditions, they are beyond the control of man.

SUMMARY AND CONCLUSIONS

1. The average net cost of hatching 100 Cantonese chicks was found to be ₱24.26, or around ₱0.24 per chick.

2. The amount of feeds needed to raise 100 pullets to 24 weeks was 264.01 kilograms of grain, 269.69 kilograms of mash, and 94 incubator eggs.

3. The net cost of producing 100 pullets was found to be ₱126.43. The total cost of feeds was ₱116.51, of labor ₱25.24, and of fuel ₱7.37.

4. The amount that was realized from cockerels of 12 weeks old was ₱73.07 and from the pullets at 24 weeks old, ₱301.79. In other words the total sum realized from 865 hatching eggs which gave 387 chicks, was ₱374.86.

5. The separation of the cockerels from the pullets at the age of twelve weeks gave more room for the growing pullets and the pullets were saved from being annoyed by the aggressive and maturing cockerels.

6. The largest items in the raising of pullets were (1) cost of hatching chicks, (2) cost of feeds, and (3) capital charges.

7. The total cost of raising the pullets and cockerels from egg up to 12 weeks old was ₱172.06, or around ₱0.54 a bird.

8. It was found that 521 hatching eggs were necessary to raise 100 pullets.

9. By raising 166 pullets to maturity, the net income was found to be ₱93.45.

10. The cost of hatching, of feeds, and the capital charges was found to be 88.46 per cent of the total cost of production. The net income was 21.73 per cent based on the total investment.

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NOTE: LOS BAÑOS BIOLOGICAL CLUB

At the twenty-sixth scientific meeting of the Los Baños Biological Club held March 3, 1927, the last for the college year 1926–1927, election of officers for the ensuing year was held. Dr. A. K. Gomez of the College of Veterinary Science was elected president, and Dr. F. M. Fronda of the College of Agriculture, secretary. At the close of the meeting, Dr. L. B. Uichanco, the retiring president, read the following report:

The following is a brief report on the activities of the club during the college year 1926–1927:

Number of meetings held	7
Total number of departments which presented papers	7

Number of papers read, listed by departments (detailed list, as compiled by the retiring secretary, Dr. A. K. Gomez):

Agronomy	3
Animal Husbandry	7
Chemistry	1
Plant Pathology	1
Plant Physiology	1
Entomology	1
College of Veterinary Science	5
Total	19

While the number of meetings, as well as number of papers read, was somewhat smaller than in past years, yet it can be pointed out with pride and without fear of successful contradiction that the commendable precedent established by past administrations in maintaining a uniformly high quality of material and insisting that only products of original research be reported on programs of the Club was closely adhered to. Moreover, without attempting to offer apologies, it may be noted for purposes of record, that this slight reduction in number of meetings and of papers read was due to causes beyond our control, among these being the unusually bad weather prevailing, which culminated in the severe typhoon of November 5, 1926, which interfered with cultures in many departments; diversion of activities of not a few members in preparing papers for scientific meetings of other organizations; and absence from the Campus for a large part, or for the entire year, of three of the most energetic and productive contributors.

Judging from the continued interest and enthusiasm of the members, as seen from the large attendance at each meeting and the increasing proportion of members taking part in discussions of papers, the Club gives promise of a long, healthy, and progressive existence.

The retiring officers desire to express their thanks to all the members for giving them this opportunity for service, and for their generous co-operation. We bespeak for the incoming officers the same hearty support.

The list of papers read before the Los Baños Biological Club during the academic year 1926–1927, was appended to the retiring president's annual report and follows:

List of papers read before the Los Baños Biological Club during the academic year 1926–1927:

Agronomy Department

1. Dr. Vicente C. Aldaba—Differentiation of canton fiber from abacá.
2. Dr. Nemesio B. Mendiola—Natural crossing in rice and its relation to rice improvement.
3. Mr. Pedro A. Rodrigo—Growing of peanuts from cuttings.

Animal Husbandry Department

1. Dr. B. M. Gonzalez—Experience in the Philippines with the introduction of pure breed animals to improve the common stock.
2. Dr. F. M. Fronda—Studies on the fertility of the hen's egg.
3. Dr. B. M. Gonzalez—Observations on the duration of service and serviceable life of work cattle.
4. Dr. M. Mondoñedo and Mr. P. Bayan—A comparative study of corn and cassava as feeds for hogs.
5. Dr. Valente Villegas and Mr. A. D. Pablo—A preliminary study on the dairy qualities of goats.
6. Dr. B. M. Gonzalez—Observation on education and research in Japan—agricultural and general (with lantern slide illustrations).
7. Dr. F. M. Fronda—A short cut method for determining approximately profits and losses in a poultry project.

Chemistry Department

1. Dr. F. O. Santos and Mr. E. Collado—The nutritive value of sweet potato: I. The anti-nuritic properties of the leaves and shoots.

Plant Pathology Department

1. Dr. G. O. Ocfemia—The bunchy top of abacá.

Plant Physiology Department

1. Mr. Fernando de Peralta—Growth and development of young rice plants grown in complete culture solution to which NaCl was added.

Entomology Department

1. Dr. L. B. Uichanco—Insects in relation to the introduced cultivated element of the Philippine flora.

Veterinary College

1. Dr. Manuel Robles—A résumé of the causes, classes and occurrences of accidental wounds among domesticated animals.
2. Dr. Marcos Tubangui—Laboratory studies on surra with special reference to the nature of the immunity following the cure of experimental infections.
3. Dr. Zacarias de Jesus—Cysticercosis in the native swine.
4. Dr. G. San Agustin—Meat inspection work in relation to public health in the Philippines.
5. Dr. A. K. Gomez and Dr. Z. de Jesus—The production of biological products in the College of Veterinary Science.

The Los Baños Biological Club is composed of the Los Baños faculty members of the University of the Philippines, who are interested in biological research. One feature of this organization is that it has no constitution,

only six brief and simple "rules of conduct." The number of officers has been reduced to a minimum, a president and a secretary.

The Los Baños Biological Club was organized November 15, 1923. The first scientific meeting was held December 4, 1923, and scientific meetings have been held regularly each month, except during the summer months, since organization. Since its foundation, seventy-four scientific papers have been presented. These are distributed among the different departments of the Los Baños Colleges as follows:

	1923–1925[a]	*1925–1926*	*1926–1927*	*Total*
Agricultural Engineering	1	1	0	2
Agronomy	5	6	3	14
Animal Husbandry	4	3	7	14
Chemistry	2	1	1	4
Entomology	2	2	1	5
Forestry	1	0	0	1
Medical Department	0	1	0	1
Plant Pathology	4	4	1	9
Plant Physiology	4	3	1	8
Veterinary College	5	6	5	16
Total	28	27	19	74

[a] Covering a period of from December 1923 to March 1925.

F. M. Fronda, *Secretary.*

ABSTRACT[1]

A study of the root system of rice. Emilio T. David. (*Thesis presented for graduation, 1926, with the degree Bachelor of Agriculture, from the College of Agriculture No. 250; Experiment Station contribution No. 447.*)—The author studied the root system of rice as affected by different soil conditions and different amounts of water. He used 28 varieties of lowland rice for the study of the root zones and 18 varieties of upland rice for the study of growth and feeding area of roots.

A pit was dug near each plant and the spread, depth of penetration, and strata where the most roots were found were noted. In connection with this, the author made note of the spread, depth, and weight of the roots of both upland and lowland rice. He further studied the correlation of the root development of the seedling to its future development. In the study of the effect of soil, clay loam, silt, clay, and sand were the types used with five plants each in each series. Lowland rice was studied for the root development 25 and 50 days after sowing; for feeding area, studies were made after 68 days. The length of the roots were measured by the aid of a hand lens and a millimeter calibrated board.

The author found that variation in the root system within the variety is not marked, but in the different varieties, marked differences were noted. The contrast was particularly true in the case of lowland rice.

The roots of Tiniaong and Vinalintin have greater penetration, spread, and depth than the other varieties studied.

The spread of the root system is not positively correlated with the depth, and the root development of seedlings is not an index to the future behavior of the plants.

The feeding area of the different caiñgin rice varieties was marked under the same treatment and conditions.

The root systems of lowland rice are larger in size and softer than in the upland varieties. Upland rice has the tendency to ramify profusely.

Among the five degrees of saturation, the longest roots were found in the soak culture. With increase of water supply there was increase in length, width, and weight of the roots.

The weight of the roots was found to be proportional to the weight of shoots.

Clay loam gave the heaviest, greatest number, and longest root developments.

—*Abstract by Simplicio Oliveros.*

[1] Abstract prepared as part of required work in English 6, College of Agriculture.

HE CANNOT READ HIS TOMBSTONE WHEN HE'S DEAD

If with pleasure you are viewing any work a man is doing
If you like him, if you love him, tell him now;
Don't withhold your approbation till the parson makes oration
And he lies with snowy lilies o'er his brow.
For no matter if you shout it he won't really care about it,
He won't know how many tear-drops you have shed;
If you think some praise is due him now's the time to slip it to him,
For he cannot read his tombstone when he's dead.

More than fame and more than money is the comment kind and sunny
And the hearty, warm approval of a friend,
For it gives to life a savor and it makes you stronger, braver,
And it gives you heart and spirit to the end;
If he earns your praise, bestow it; if you like him, let him know it,
Let the word of true encouragement be said;
Do not wait till life is over and he's underneath the clover,
For he cannot read his tombstone when he's dead.

—*Cultivator* (California).

The business world will never forget the incident when the late J. Pierpont Morgan appeared before a Congressional Committee at Washington and was asked what was the greatest credit asset in the financial world. And as a room full of spectators and a table full of press representatives, who were to telegraph the answer to every part of the country, leaned forward to hear the reply, there rang out like a pistol shot, into a room so quiet that you could hear a pin drop, the one word "CHARACTER."—Edward Bok.

"God, give us men. A time like this demands
Strong minds, great hearts, true faith, and ready hands;
Men whom the lust of office does not kill;
Men whom the spoils of office cannot buy;
Men who possess opinions and a will;
Men who have honor—men who will not lie;
Men who can stand before a demagogue
And scorn his treacherous flatteries without winking;
Tall men, sun-crowned, who live above the fog
In public duty, and in private thinking."

—J. G. Holland.

EXCHANGE NOTES

A very comprehensive bibliography of books and pamphlets pertaining to youth and the farm has been published recently in mimeograph form by the U. S. Department of Agriculture. A total of 128 books are listed and briefly reviewed, and a good index is provided. If you can use a copy of this, write to department.

—*Extension Letter.* (University of Hawaii).

At the National Dairy Show in Detroit when Gertrude Kaiser won highest individual honors in the national junior dairy cattle judging contest there were but four girls in the contest. Before going to Detroit, Gertrude had walked off with the state championship for Iowa in junior dairy cattle judging at the Dairy Cattle Congress. In that contest, 125 boys participated and five girls.

—*Successful Farming* (Iowa).

The students enrolled in the vocational agricultural courses throughout the state realized an average of $1.09 per hour on the time spent on their home projects for last year. This work is required of all those enrolled in the Smith-Hughes agricultural courses. It is the means by which experience is obtained to correlate with the agricultural instruction in the classroom. The type of project carried by each student is selected on the basis of the interests of the student, his probable ambitions as a farmer, and upon the amount of practical experience and education it is possible to obtain from the enterprise. These projects vary in type and scope from the caring of 15 acres of orchard to the raising of 1,000 baby chicks, or the production of ten acres of beans to the raising of three pure breed heifer calves.

In all there were 1,466 projects carried with a total profit of $144,772.29, or an average of $98.75 per student. Many students in addition to having had excellent preparation for their future as farmers, have been able to make enough money to pay their way through an agricultural college.

—*Cultivator* (California).

The area under rice cultivation (in Siam) has increased from 7,300,000 to approximately 17,700,000 rai (2,885,000 to 7,980,000 acres), and the quantity of rice exported has risen from 8 to an average of over 18 million piculs. That was the average in normal years till recently, but in the three years 1921–22 to 1923–24 it was over 21 million piculs, falling to 19.2 mil-

lions in 1924–25 and rising to 22.9 million piculs in 1925–26. The production has increased correspondingly, and in a good year is now quite 82 million piculs of paddy, in addition to which a balance of 14 million piculs will have been brought from the previous year, making a total of 86 million piculs to be dealt with. Of this total 5 million piculs are retained for seed, 45 to 50 million piculs are used as food, and from 27 to 32 million piculs are exported, leaving 14 million piculs to carry forward. These are the paddy figures for the whole Kingdom, and are somewhat smaller when converted into rice figures. In the seven principal provinces the area under paddy in 1925–26 was 10,192,200 rai (4,076,880 acres), and the yield was 37,126.070 piculs (2,209,888 tons). The damaged area was unusually large.

It is estimated that the population is increasing at the rate of 11 per thousand. The estimated population for the current year is about 10 millions.

—*The Directory for Bangkok and Siam* (1927).

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Pigs will eat partially or fully ripened bananas as readily as will human beings, but of course it is only damaged, small, or ill-shaped fruit that could be profitably used as a pig feed. . . . . But it should be borne in mind that it would certainly pay better to feed them in combination with milk, maize, maize meal, sweet potatoes, or other farm crop than to attempt to feed them as the principal food given to the pigs.

—*Agricultural Journal* (Queensland).

———

The exports of cocoa from the Gold Coast (West Africa) have increased to over 223,000 tons, representing a value, even at present low values of nearly £9,000,000 (nine million pounds), and all is unfermented cocoa. This flood of inferior cocoa has altered the market; the manufacturers have to take it and make the best of it. But manufacturers of cocoa powder and chocolate would prefer fermented cocoa if they could get it in sufficient quantity; some manufacturers still use nothing else, others use both kinds and blend, others only the cheapest.

—*Agricultural Society Journal* (Jamaica).

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There are various references in entomological literature to solutions for preserving books in the Tropics from attack by insects. The following is effective.

1/4 oz. creosote
1 oz. corrosive sublimate
1 oz. carbolic acid
2 pts. methylated or white rum spirit

—*Agricultural Society Journal* (Jamaica).

COLLEGE AND ALUMNI NOTES

Science and the Common Farmer, editorial by Dean Baker in THE PHILIPPINE AGRICULTURIST, June, 1926, was reprinted in *The Journal of the Madras Agricultural Students' Union* for July, 1926.

Sugar Cane Breeding in the College of Agriculture: IV. Training sugar cane plants for convenient pollination work, by Toribio Mercado which appeared in THE PHILIPPINE AGRICULTURIST, February, 1926, was mentioned editorially by *The Tropical Life* of August, 1926.

Selection of Mosaic Free Cuttings of Sugar Cane by J. O. Unite and J. M. Capinpin, which appeared in the July, 1926, issue of THE PHILIPPINE AGRICULTURIST was reprinted in full in *The Planter and Sugar Manufacturer* in its August 21, 1926, issue. The same article was abstracted in the *Review of Applied Mycology*, 5: 764–765, December, 1926.

The College was honored by several Japanese visitors of note in February and March. Among these were Mr. Yoshifusa Iida, stock-farm expert of the Formosan Government. He inspected the College, particularly the Animal Husbandry Department, and consulted with our animal-husbandmen. Major Kenji Matsumoto and Major Yorimichi Suzuki, of the Japanese army who were here on February 16, were especially interested in horse breeding. On March 21, a party consisting of one professor from an agricultural school and thirteen principals of public schools in Korea spent several hours on the Campus.

Professor David L. Crawford, for a number of years a member of the staff of the University of Hawaii, has been appointed President of this University. Professor Crawford was a student of Dean Baker's, some twenty-three years ago, at Pomona College, California.

Miss Kathleen MacGregor Davis of London was house guest at Copeland House for a few days in March. Miss Davis is a graduate of the Women's Agricultural College at Swanley, Kent, England, specializing in horticulture. The courses in this college, according to Miss Davis, are no lily-handed jobs. All the manual labor, spading, raking, handling manure, painting greenhouses, etc., is done by the students. The outside, or manual labor totals about seven hours a day. On this work full notes on observations are kept. Two to three hours lectures are given daily.

Students taking the agricultural course do all field work, plowing, harvesting, etc. Many of the students are daughters of titled fathers and of men of wealth. They are studying that they may know how to manage their own gardeners and estates. They are shown no favors in the college work. Many graduates go right into good jobs, as in Kew Gardens or as head gardeners on estates. While here, Miss Davis climbed Mount Maquiling and was most enthusiastic over its flora wonders and beauty.

Dr. W. H. Brown, Director, Bureau of Science and Dr. Otto Reinking were Campus visitors in March. Doctor Reinking sailed for the United States by way of Panama, early in April, after some two years spent in the East and Australia seeking new varieties of banana for the United Fruit Company. Doctor Reinking is Plant Pathologist for the Company.

Mr. Ramón Misa, Superintendent of Iwahig Penal Colony, was a college visitor in February. Mr. Misa was formerly superintendent of San Ramón Penal Farm.

Mr. H. T. Edwards, Specialist in Fiber Plant Production with the United States Bureau of Plant industry and Doctor Sherman of the Bureau of Science, Manila, were Campus visitors recently. They came to confer with Doctor Aldaba, of the Fiber Division and Doctor Ocfemia of Plant Pathology.

T. F. O'Leary, for three years assistant professor of English, sailed for the United States *via* Europe on *S. S. Trier,* March 21.

Wealth Awaits You on the Farm, issued as College Circular No. 12 is a striking prospectus of the College. The cover is a half-tone showing a live scene around a rice thresher. "A Message to the Young Men of the Philippines" is the caption on the first page. This message is strengthened by several half-tones of college buildings, exterior and interior, athletic groups and "lab" groups. The pages giving in brief the courses are enlivened by many half-tones showing what we do here. The last page carries in special type "Higher Education in Agriculture Leads to Economic Independence." All in all this is a circular with spirit. It was prepared especially for circulation among high school graduates with the query "What shall I do?" facing them.

The College of Agriculture Class of '27 graduated by the University of the Philippines numbers 43.

For the Degree of Bachelor of Agriculture
(General Curriculum)

Aves, Leopoldo
Briones, Buenaventura C.
Eala, Quintin
Español, Filemon
Gamo, Enrico B.
Inciong, Antero
Lacuesta, Gabriel
Lina, Valentin K.
Macasaet, Emilio
Medrana, Constancio T.
Morales, Eufrain
Muyargas, Agapito
Palisoc, Eleuterio
Paller, Enrique
Robin, Pascual
Sumagit, Felix S.
Tugade, Primitivo
Urbino, Cornelio
Caliñgasan, Martin G.

For the Degree of Bachelor of Agriculture
(Animal Husbandry Curriculum)

Limpiado, Leoncio
Ordoveza, Fernando C.
Paje, Pedro S.
Serrano, José
Villanueva, Ceferino

For the Degree of Bachelor of Science in Agriculture
(General Curriculum)

Antipolo, Petronilo
Arnaldo, Marcelo V.
Balagtas, Amado
Cruz, Amado J. de la
Derecho, Constantino
Durano, Antonio
Estañol, Juan D.
Etorma, Severino
Flores, Nicomedes
Florida, Vicente
Florita, Numeriano
Oliveros, Simplicio
Valenzuela, Pedro D.
Villar, Ulpiano

For the Degree of Bachelor of Science in Agriculture
(Supplementary Curriculum)

Bayan, Paterno
Gonzales, Salustiano S.
Lopez, Victoriano
Reyes, Fidel M.
Villanueva, Leopoldo J.

Benjamin Hollero was awarded the Joaquin J. Gonzalez Medal and Student Council Gold Medal, both for highest scholarship during the course. Pedro S. Paje was awarded the Class '25 Medal for the best thesis.

An unusually large number of the graduates are going directly into agriculture, on their own or father's farms, or on coconut plantations, managers of poultry farm, or in sugar centrals.

The Summer School enrollment numbered 370. Twelve of these came for the special course in Poultry Raising.

There were three students doing special work in cattle husbandry.

Doctor Research to the Rescue, a dramatic agricultural demonstration, was presented by the English Department, January 28, in the College Auditorium to an invited audience. This was the first attempt in the College to show the value of the drama in popularizing technical agriculture. On request from the head of English Department, Associate Professor Yule, five graduate assistants each wrote a scene demonstrating one phase the work in his department. Miss Wilson of the English Department wrote a prologue and arranged these five scenes for presentation.

The scenes were: *Prologue:* by Miss Margaret C. Wilson. *Scene I:* Stock and Stockmen Come for Aid, by Mr. Paterno Bayan, Animal Husbandry Department, and Mr. Enrique Paller. *Scene II:* Feminine Vanity is Satisfied, by Mr. Edilberto Punzalan, Department of Agronomy. *Scene III:* Mr. Vitamin Defeats Mr. Beriberi, by Mr. Esteban Collado, Chemistry Department. *Scene IV:* The Romance of Miss Rice and Mr. Soil, by Mr. Artemio V. Manza, Plant Physiology Department. *Scene V:* A Plant Disease Clinic, by Mr. Macario Palo, Plant Pathology Department.

Twenty-six characters appeared in the drama. The most important, of course, was Doctor Research which was ably interpreted by Pascual Robin. The costumes were designed by Mr. Moisés Villaluz and Mr. Vicente Dawis. Miss Margaret C. Wilson of the Department of English directed the play.

On March 1, was the Annual General Inspection of the Cadet Corps by Major Escott B. Miller, U. S. A. Military Commandant for the University, and Major Edwin H. Hardy of the General Staff, U.S.A., and Captain George F. Bloomquist, U.S.A. The Annual University Medals were awarded to the following cadets:

Leadership Medal to Cadet Captain Brígido A. Huligañga; awarded for highest quality of command and leadership.

Efficiency Medal to Cadet Captain Agustin Hermano; awarded to the cadet captain commanding the winning company.

Honor Medal to Cadet Sergeant Delfin Española; awarded for highest record in obedience to rules and regulations of the Department and discipline in ranks and classes.

Loyalty Medal to Cadet Private Anacleto Espinas; awarded for the most perfect attendance, an average grade of at least 2, and for highest record in helpfulness to the Department throughout the year.

Duty Medal to Cadet Private Anacleto Coronel; awarded for the most perfect attendance, and an average grade of at least 2.

Marksmanship Medal to Cadet Major Narciso Lofrades; awarded for the best record on the range for the year.

The following cadets also received medals during the year 1926–1927:

U. P. Team Medals.....	Cadet Private Justo Capili Cadet Corporal Baldomero Salinas Cadet Private Francisco Gestoso Cadet Private Felix Enrile Cadet Private Bernard Wideman Cadet First Sergeant Fernando Fernandez
Marksman (Rifle C).....	Cadet Major Marciso Lofrades Cadet Private Victoriano Aviguetero

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Professor Higgins wrote Dean Baker from Los Angeles that Mrs. Higgins is slowly improving in health. But the physicians are definite in their decision that she must not return to the Orient.

Mr. Dionisio Aquino, B. S. '23, now studying in Iowa State College, writes that he has been appointed a Fellow in the Department of Soils. This appointment carries a salary of $60 (₱120) a month. "Competition for jobs among self-supporting Filipino students is keen," Mr. Aquino writes. "Washing dishes, beating rugs, serving oil and gas to motorists from four to eleven in the evening are popular occupations. My old violin is responsible for part of my earnings. Every night I play at the College Inn Cafetería for 45 minutes for my three meals a day. I oftentimes play for dances, and at banquets, where I get from $5 to $8 for two or three hours playing."

Mr. Feliciano Reveche, B. Agr. '23, recently turned down a "white collar job" for the farm.

"I rejected the offer of ..... to me, because I have now decided to stay on the farm. At present I am doing some truck gardening, and managing a big plantation of abacá, coconut, rice, and a herd of 40 cows. To be a manager is a big job—the manager always has new problems to be solved every day, right in the field."

Mr. Artemio V. Manza, B. S. '23, graduate assistant in Plant Physiology, sailed for the United States on *S. S. Empress of Canada*, April, 1927. Mr. Manza expects to continue his studies in the College of Agriculture, University of California, Berkeley. Before he left the College Campus, a gay dinner was given in his honor by the staff of the Department of Plant Physiology at Molawin Hall. Mr. Pascual Robin, B. Agr. '27, will take Mr. Manza's place during his sojourn in the United States.

Mr. Fernando de Peralta of the Department of Plant Physiology spent his vacation with his home folks at Claveria, Cagayan.

Mr. Emilio David, B. Agr. '26, was a special student in Cattle Husbandry during the Summer Session. Mr. David reports success on his father's rice farm in San Miguel, Bulacan, with application of methods and knowledge gained in the College. He is an enthusiastic booster for technical education for farmers. He is planning to branch out into cattle raising. Wisely, he comes to the spring furnishing knowledge on this subject for a drink before buying his cattle.

Mr. Pedro S. Paje, B. Agr. '27, will be manager of a poultry farm in Baclaran, Parañaque, Rizal. Mr. Paje gets a good salary and liberal percentage of profits. Mr. Paje's medal thesis was on cost of raising pullets.

Mr. Fernando V. Ordoveza, B. Agr. '27, is managing his father's farm in Sta. Cruz, Laguna. He went to Tayabas the middle of April to locate a ranch. He expects to farm for two years after which he plans to go to the United States to travel and get information regarding agricultural enterprises.

New books and other publications added to the Library, College of Agriculture from January 1 to April 7, 1927

Annual report of the Bureau of American Ethnology to the Secretary of Smithsonian Institution. 1919.

Crittenden, J. J.
Calendar of the papers of Crittenden, J. J.

Directory of Bangkok and Siam. 1927.

Fitzpatrick, J. C.
List of the Washington manuscripts from the year 1592–1775.

Franklin, Benjamin
Papers of Benjamin Franklin in the Library of Congress. 1905.

Gregory, J.
Catalogue of early books on music in the Library of Congress. 1913.

Griffin, A. P. C.
A union list of periodicals, transactions, etc. 1901.

Haas, T. and Hill, T. G.
An introduction to the chemistry of plant products. 1921. Vols. 1 and 2.

Heilprin, A. & L. (eds.)
A complete pronouncing gazetteer of geographical dictionary of the world. 1922.

Ingram, J. Van Ness
A check list of American eighteenth century newspapers. 1912.

International Association of Instructors and Investigators in Poultry Husbandry: Proceedings of the meetings for the years 1908–1910.

Johnston, W. D.
History of the Library of Congress. 1904.

Lane, W. C.
A. L. A. Portrait index in the Library of Congress. 1906.

Library of Congress:
American and English genealogies. 1919.
A check list of American newspapers. 1901.
Check list of collections of personal papers. 1918.
Copyright decisions, 1918–1924 (Bull. No. 19).
Copyright decisions of U. S. courts, 1913–1914 (Bull. No. 17); 1914–1917 (Bull. 18).
Handbook of manuscripts. 1918.
Manuscripts in public and private collections in the U. S. 1924.

Lowery, B.
Descriptive list of maps of Spain. 1912.

MacCurdy, R. M.
A history of the California Fruit Growers Exchange. 1925.

Monroe, James (Library of Congress)
Papers of James Monroe in the Library of Congress. 1904.

National Library of Wales
A bibliography of Robert Owen, the socialist. 1925.
Biblioteca celtica for 1910–1918.
Catalogue of manuscripts. 1921. Vol. 1.
Catalogue of oriental manuscripts, Persians, Arabic and Hindustans. 1916.
Catalogue of tracts of the civil war and commonwealth period relating to Wales and the borders. 1911.

Naval record of the American revolution, 1775–1788.

New Zealand official yearbook. 1927.

Noyes, C. S.
Noyes collection of Japanese prints. 1906.

Official yearbook of the commonwealth of Australia. 1926.

Palmer, T. W.
Guide to the law and legal literature of Spain. 1915.

Pardo de Tavera, T. H.
Biblioteca Filipina. 1903.

Parsons, A. J.
Catalog of the Gardener Greene Hubbard collection of engravings. 1905.

Pearl, R.
Introduction to biometry (medical) and statistics. 1923.

Philippine Sugar Industry.
Handbook. 1927.

The Philippinesian. 1926.

Phillips, P. L.
A list of atlases and maps applicable to the world war. 1918.
A list of geographical atlases in the Library of Congress. Vols. 1-4.
A list of maps of America in the Library of Congress. 1901.
A list of works relating to cartography. 1901.

Proceedings of the second conference of teachers of International Law and related subjects. 1926.

Report of the Librarian of Congress
1898–1899, 1901–1926.

Report of the progress of agriculture in Mysore. 1926.

Solberg, T.
Copyright in Congress. 1789–1904.

Sonneck, O. G.
Dramatic music in the Library of Congress. 1908.

Subject headings used in the dictionary catalogues of the Library of Congress. 1919.

Tripp, G. E.
Electric development as an aid to agriculture. 1926.

U. S. D. A. Agriculture yearbook 1925.

U. S. National Museum
Annual report of the Smithsonian Institution. 1905, 1907, 1914–1917, 1922–1923.
Proceedings, Vols. 52–53, 55–65.

Von Noorden, C.
Clinical treaties on the pathology and therapy of disorders of metabolism and nutrition. Parts 2-9.

Washington, George
Calendar of correspondence, Vols. III and IV (Index).
A calendar of Washington manuscripts in the Library of Congress. 1901.
List of Washington manuscripts 1592–1775.
Papers of George Washington I, correspondence with continental Congress. 1906.
Papers, No. 2, Vols. I (1775–1778) and II (1778–1780).

Wiley, H. W.
Principles and practice of agricultural analysis. Vol. I (1926).